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VOL. 30 — January, 1921 — No. 4

Table of Contents

Page

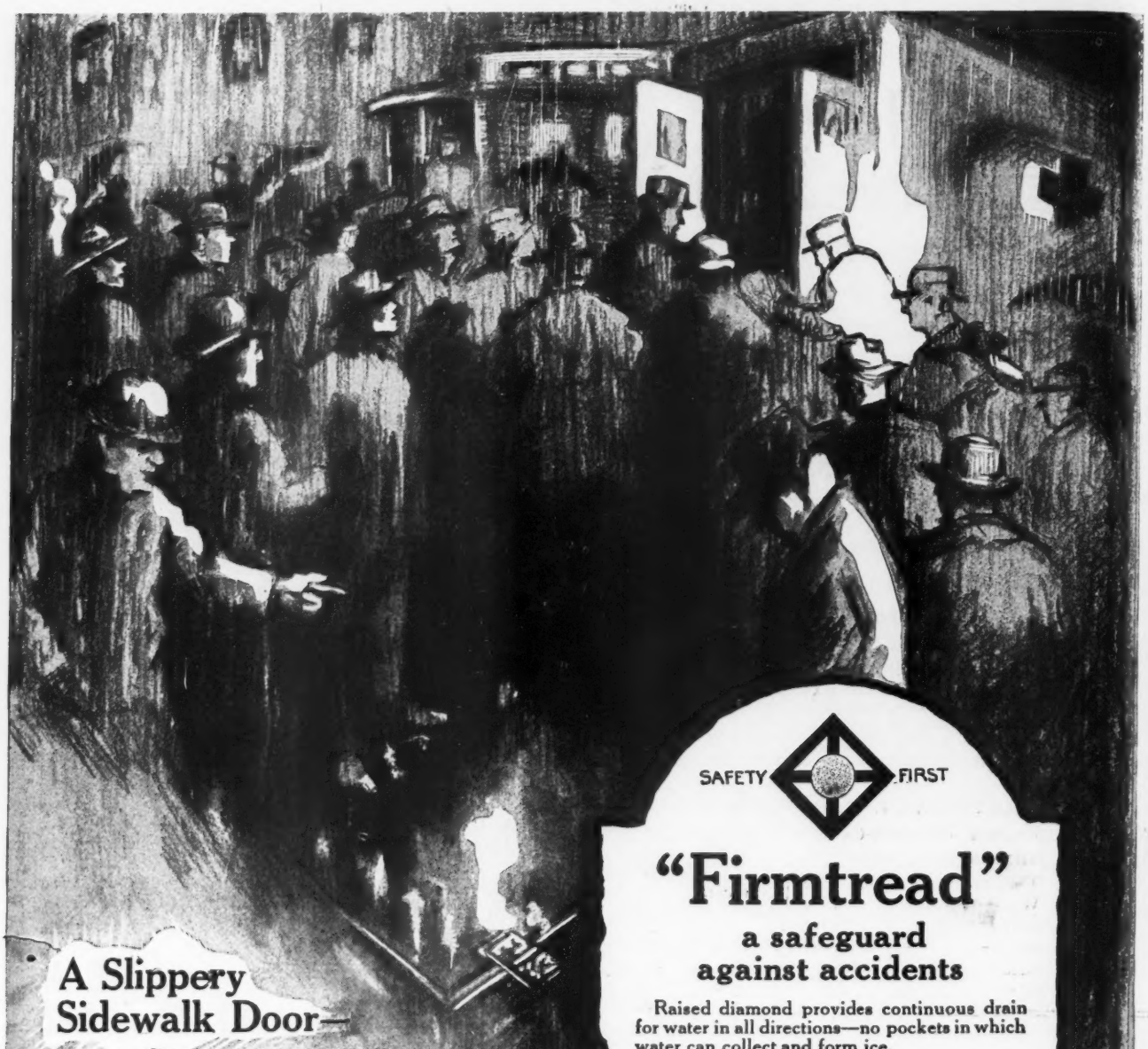
Short Talks by the Editor..... 79
Happy New Year!..... 79
Transport Building Material During Winter 79
Some Good News for Our Subscribers. 79
Some Signs of the Times..... 80
Cartoon: Start the New Year Right.... 81
Our Trade with Oriental Countries..... 82
Our Front Cover Colonial House..... 84
Cozy, Hospitable, Five-Room Bungalow 87
Woman and the Home..... 88
Building the House of a Thousand Comforts 88
Milady Must Decide Many Important Problems for Contractor When Drawing Up Plans for New Home.. 88
Garages Delivered to Owner by Auto Truck 91
Building the House of Brick..... 91
Method of Laying Common Brick in Buildings, etc., Shown in Detail on Blueprint Page 91
Excellent Type of Substantial Brick Residence 92
Blueprint—Common Brick Construction 93
How to Build the Foundation..... 94
Various Types of Concrete Foundations Described 94
Charming, Substantial Home for the Family 97
Built-in Conveniences for Bath Room and Kitchen 98
Many Features Can be Added at Economical Cost to Lighten Work of Housewife and Improve Appearance of Rooms 98
Steel Lumber Construction.....100
Steel Lumber Joists in Floor Construction 100

Page

Recent Development of Light Pressed Steel Beams and Studs Has Increased Use in Residential Structures 100
Concrete Block Garage with Stucco Finish 102
Unusually Attractive Building Has Distinctive Facade and Large, Easy Moving Folding Doors.....102
Economical Ice House.....103
Elevator Service in the Home..... 103
Built-in Dumbwaiters Prove to be Popular Labor-saving Device.....103
Comfortable Farm Home of Distinctive Lines 104
Blueprint—Dumbwaiter Elevation.....105
Law for the Builder.....106
Sidewalk Lights Increase Building Space 107
Modern Store Building.....108
Blueprint—Sidewalk Light Construction.109
Bungalow of Pleasing Design.....110
Concrete Hog Wallow.....111
Wood Block Floors in Factory Buildings.111
Special Creosoted Blocks of Various Shapes Used Extensively in Factory Structures 111
Auto Service Station with Wood Block Flooring Details 112
Blueprint—Wood Block Flooring.....113
Design of Safe Construction.....114
Long Columns 114
Colors for Interior Surfaces.....116
Putting the Sunshine in Factories and Shops 118
Daylight Steel Sash Provides Ample Natural Light and Adequate Ventilation and Helps Keep Employes Cheerful and Satisfied.....118
Gambrel Roofs for Hog Houses.....119

Page

Electric Light Plant Demonstrating Car Gets Results 120
Making Phonographs During Slack Season 122
Attractive and Profitable Sideline for Builder Who Has Workshop and Business Initiative 122
Concrete Blocks Are Stepping Stones to Success 124
Charming Bungalow of Brick.....126
Correspondence Department.....128
Needs Information on Store Front Remodeling Job 128
Tennessee Builder Reports Activity...128
Seeks Light on Labor Estimating.....128
How Do You Lay This Floor?.....128
Answers One Question and Asks Several More 130
Wants to Build a Boat.....130
Explains Cistern Capacity Formula...130
Mr. Mahoney, a Solution for Your Problem 130
Design and Construction of Paying Properties—Residential Hotels.....131
Breaking Up Concrete Inside of Buildings 174
What's New 176
The Automatic Servant.....176
Parallel Ruling Attachment for Drawing Board 176
New Wooden Base for Plaster and Stucco 178
Inexpensive Elevator for Small Buildings 180
Handy Fountain Ruling Pen.....180
Motor Trucks and Trailers.....182
How to Buy a Motor Truck.....182
News of the Field.....188
Safety Methods Used in Steel Plant.....188
Catalogs, Bulletins and Books Received.192



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For Safety and Economy

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"Firmtread"

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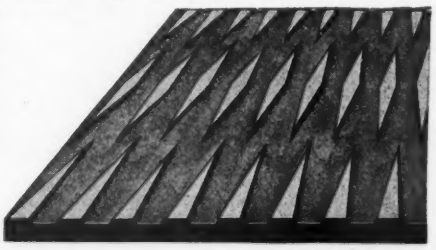
But "Firmtread" is the only floor plate with all of these features.



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Short Talks by the Editor

Happy New Year!

WE are starting a new year, one that promises to be important for its achievements and progress. It is particularly vital because of the period of post-war readjustment from which we are emerging. The inevitable reaction following a war has been successfully survived and we stand, as it were, in the dawn of a new era. Deflation has been carried out without any serious disturbance and the business forces of the country are now ready for a new and big year. Especially is this the case of the building industry which has been held up for several years. The acute shortage of housing cannot longer be put off, and with the readjustment of costs of building material, everything is set for the greatest building program in our history. Thousands of families are waiting anxiously for the time when they can get their new home started —we believe the new year will find their hopes realized. With all hands on deck and shoulders to the wheel, the year 1921 should be a 19-plenty-one. The AMERICAN BUILDER extends to its subscribers and friends most hearty wishes for a prosperous New Year.

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Why Road Building Materials Should Be Shipped During Winter

THE road building season in the Northern states is from May to November—about six months. The average contractor, however, is able to build roads only about half of this time, for he has to contend with rainy weather, some of his men may fail to show up for work some mornings, a piece of equipment may go wrong, he may not have material, etc., etc. There are a hundred and one things that may happen on a road job to delay it, and as a result, the end of the season finds the contractor with only 75 to 100 actual working days to his credit.

The contractor is constantly trying to anticipate and prevent these delays. He adopts methods and plans his work to overcome as far as possible delays because of rains. To eliminate labor trouble he buys modern machinery that does work formerly done by hand. But his biggest delays have been because the railroads have not delivered material to him regularly during the construction season.

If the roads which are needed and wanted are to be built, something must be done to assure the contractor when he starts work in the spring that he will have his materials when they are needed. It is useless to expect him to build any considerable mileage of roads when he has to shut down his work every few days waiting for sand, stone or cement.

For that reason, a movement has been started among contractors, highway engineers, banks, chambers of commerce, railway officials, and others interested or concerned with the country's highway program, pointing out that: If road materials are transported and stored during the winter and early spring months when open top cars are more available than they are during the construction season, the contractors could proceed with considerable less interruption and their working season would be increased accordingly.

✣

Good News For Our Subscribers

THE yearly subscription price of the AMERICAN BUILDER is reduced to $2.00, effective with this issue. We are making this reduction to be in line with the spirit of the present season. All costs are coming down, and altho there has not yet been any reduction in the price publishers have to pay for paper, printing, engraving, etc., we are confident to believe that there will be lower costs in this line before the end of the year. As subscriptions are payable in advance, we believe it only fair to give our subscribers who will be renewing at this time the benefit of these lower prices, which we are hoping for.

Moreover, the AMERICAN BUILDER is glad to make this contribution to the general cause of promoting building activity at this time. We want the greatest number of people interested in building improvements to have the benefit of the ideas and inspiration presented in each issue of the AMERICAN BUILDER, and therefore are willing to put the subscription price within the reach of all.

We wish that every one of our present subscribers, numbering nearly 50,000, would get out and invite another builder to subscribe. In that way there could be two active boosters and livewire salesmen of building improvements for every one at present, and building activity would be very much increased, perhaps doubled.

Some Signs of the Times

INTEREST IN BUILDING IS VERY KEEN—BUILDERS ARE TALKING BUSINESS TO FARMERS FOR NEXT SPRING

By Lester G. Herbert

PERHAPS never in the history of our country have the people as a whole been as interested in the building proposition as they are today. We are tremendously behind our schedule. Investors are anxious to place their money so that it will earn them more; and large numbers of people are in despair for a roof to shelter them. Delays are dangerous. Prices may go down but there seems to be little hope that there can be any great change until the stress is relieved, labor is plentier, and the production of America meets the needs of our own country and the crying needs of Europe as well. Builders who are far enough sighted to co-operate with real estate men and building and loan associations and investors are sure to profit handsomely.

✣

Most buildings are leased before they are finished. Modern apartment houses, compact, complete, and attractive, are being put up in many parts of the country. The call for these is much greater than the present supply. Many people are glad to be rid of the problem of heating, snow shoveling, and general upkeep and care.

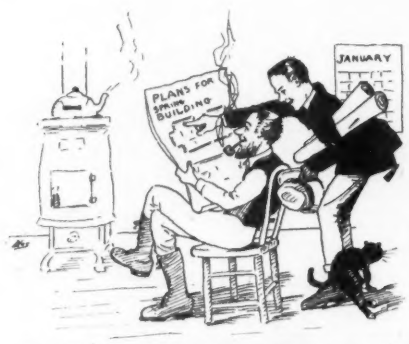
Today the great interest in home owning and high rents is prompting people to buy and to build in spite of prices as never before. Every time a house is bought by anyone, even if it has been built for years, is makes a call for the building of another house to take its place in the open market.

✣

This is the time of year to figure with farm folks on rural building plans for next spring. When we come to appreciate that no less than between six and seven billion board feet of lumber are used on our farms of the country every year, we begin to see that somebody must do a lot of building and contracting. If you wait until spring to figure with the farmer, he is too busy putting in his crops to give time or thought to the subject. Besides, he may want to furnish part of the lumber himself from his own timber land, and he will wish to get it out during the winter while the snow is on the ground. Or even if *you* furnish all of the lumber he uses, he may still want to get out lumber to sell to help liquidate the expenses of his own building.

High Rents Are Often a Boomerang. They Force People to Do the Right Thing—Buy Their Own Homes.

You will be most successful as a builder if you will cultivate the rare faculty of putting yourself in the other fellow's place. The banker, like the chess player, must do this if he is successful. He must know the moves of those with whom he is playing the game. Business men must cultivate the same degree of shrewdness or they will soon wonder why they are not getting the orders which they should. ✣



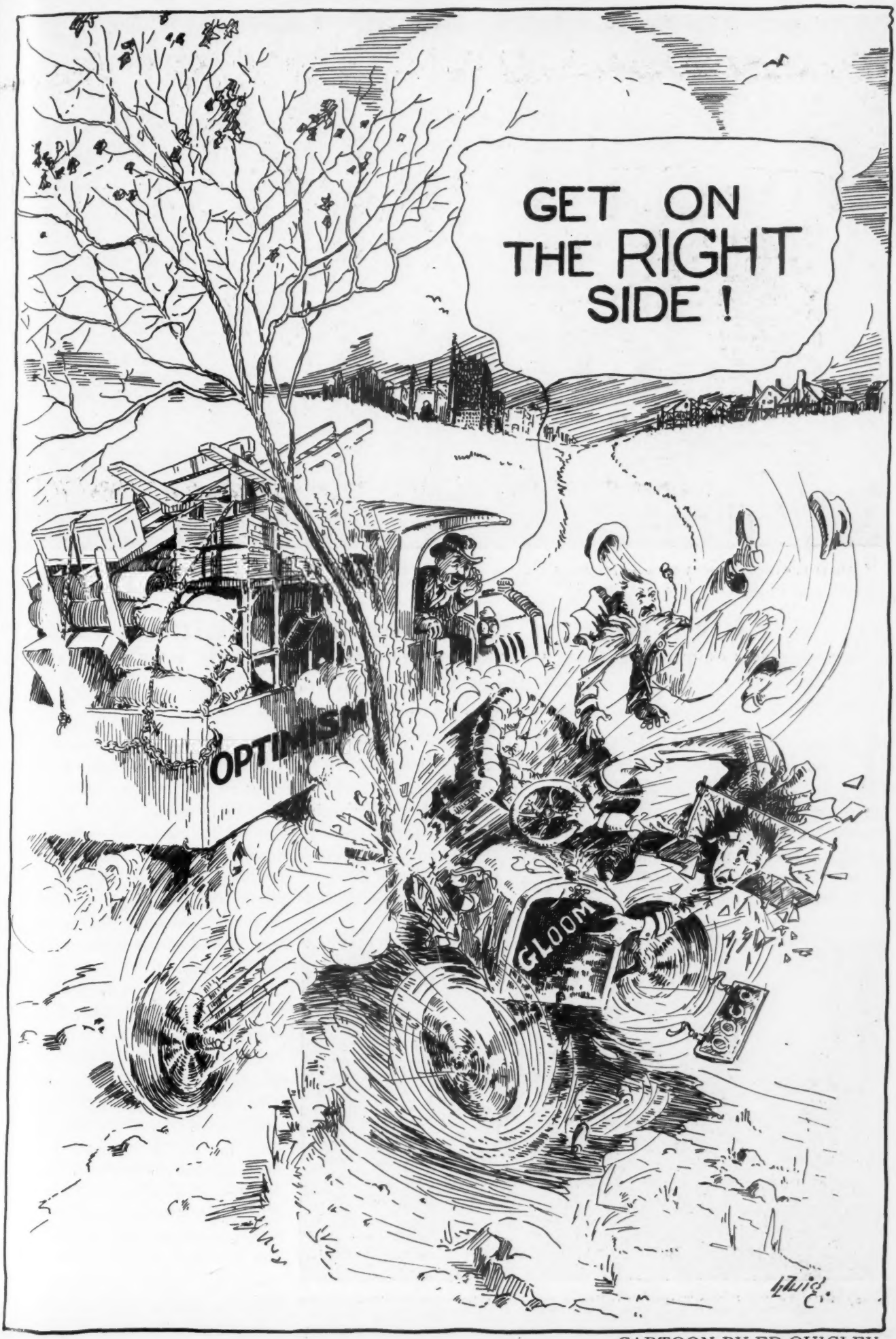
Are You Talking Spring Business with Your Clients Now? Why Wait Until It Is Too Late?

One of the biggest men in the country and one of the most successful, has chosen as his motto —"Know; don't guess!" He makes it a point of keeping so thoroly in touch with all the details and facts and the contributory circumstances of his business that he will make no foolish moves or mistakes thru ignorance. You might well take this mottor for your own —"Know; don't guess!"

✣

France a Market for American Products

THE French Government places at $2,000,000,000 the value of the furniture and other house furnishings destroyed during the war, says J. A. M. deSanchez, of the French Commission in the United States. France is greatly in need of manufactured good and altho the country has reduced her total imports from the United States by over $200,000,000 since the beginning of 1920, the reduction has not been in the imports of manufactured goods. A lack of accurate knowledge of the value of the French market, and not the exchange situation, says the French commissioner, is the real cause of the failure of American manufacturers to obtain at least a portion of the foreign trade which is now going to Belgium, England and Italy. American goods are in general not higher in price than those of Belgium and England and in most cases are at least 10 per cent higher in quality.



CARTOON BY ED QUIGLEY

Albert C. Chapin, General Manager of Lida & Co., Importers and Exporters, and William A. Radford, Jr., in the Doorway of the Company's Offices at Mukden, China.

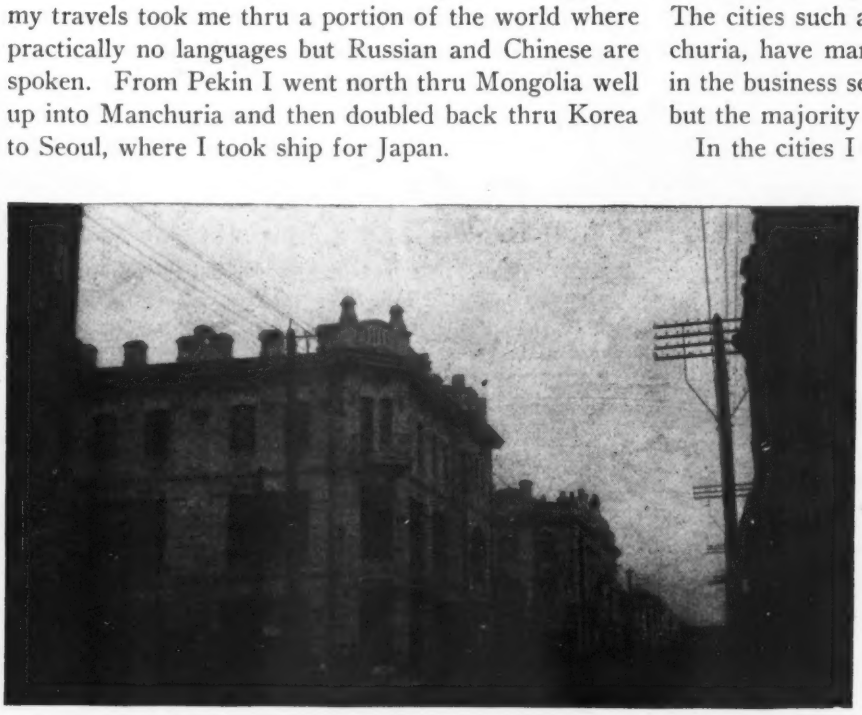
Our Trade with Oriental Countries

EXTENSION OF CREDIT BY AMERICAN MANUFACTURERS TO FOREIGN BUYERS WILL BRING HUGE SALES

By William A. Radford, Jr.

(On a Trip Around the World in the Interests of the American Builder)

YOKOHOMA, JAPAN, DECEMBER 2, 1920.—During the four weeks that elapsed between the time I left Pekin, China, and my arrival in Japan, my travels took me thru a portion of the world where practically no languages but Russian and Chinese are spoken. From Pekin I went north thru Mongolia well up into Manchuria and then doubled back thru Korea to Seoul, where I took ship for Japan.



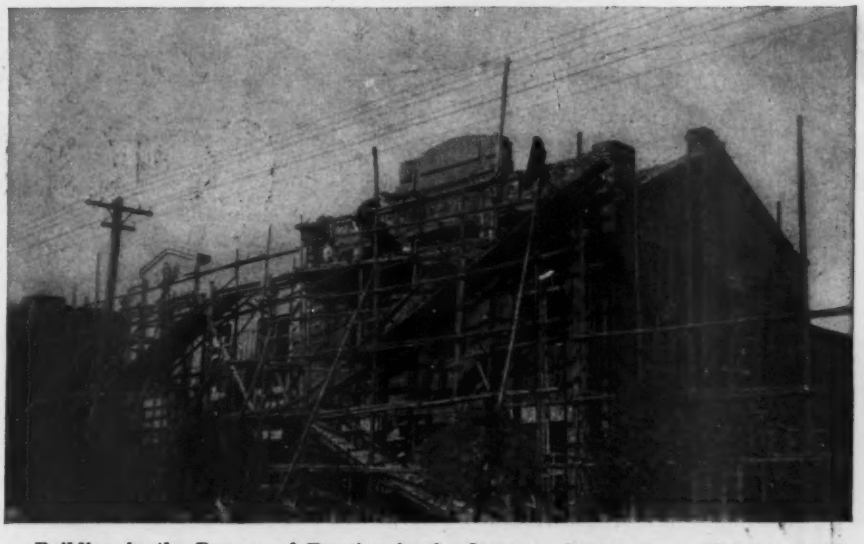
Good Buildings, Not Unlike Those in the United States, Are Found in Practically Every Large City in the Orient. This Is a Street Scene in Harbin, Manchuria.

Northern China and Manchuria are argricultural countries, the latter being in the same latitude as the northern United States and having the same climate. The cities such as Mukden, China, and Harbin, Manchuria, have many good buildings, such as are found in the business sections of the smaller American cities, but the majority are poor.

In the cities I visited, aside from the U. S. consuls, I found a number of Americans engaged in the importing and exporting business. One of them, Albert C. Chapin, general manager of Lida & Co., at Mukden, has been in China a number of years and speaks the sing-song, gutteral language as fluently as the natives. Chapin came to China in the U. S. consular service, but left it to go into the export business and has been very successful. His company has branches in many cities of the Orient. While they deal chiefly in hides, bristles and soy beans, and the products of the latter, like most importing and exporting firms in these countries they handle any-

thing or everything that there is a demand for. Mr. Chapin is enthusiastic over the future for American products in the Orient, and, naturally, favors as much as possible American-made goods.

While I have been in Japan only a few days, I can readily see that this country is reacting from the inflation of war-time. The time for readjustment has come, and business and manufacturing are not brisk, to say the least. This country is the strongest competitor the United States has in the northern countries of the Orient, but like most imitators, the Japanese do not turn out the quality of goods that come from the United States. Besides, the natives of China, Manchuria and Korea, because of political reasons, would rather purchase manufactured articles coming from some other country. Prices of American goods necessarily are higher, but they sell just the same.



Building in the Process of Erection in the Japanese Concession in Mukden, China. The Scaffolding Is of Bamboo, with Inclined Runways Going to the Various Stages Where the Masons Are at Work.

For nearly a month I was out of touch with conditions at home, but on my arrival in Japan, I discovered that the expected slump in business in the United States has come. That is just what we have been preparing for. Export business is good business, and American manufacturers and producers of everything in the commodity line need an outlet for their goods.

The principal difficulty with export business, just at present, is finance. All of the European countries, especially Germany and Great Britain, built up their enormous export business prior to the war by giving liberal credit terms. Importers have long been doing business by that method. American exporters, however, are unable or unwilling to extend such credit.

As I view the situation from this distance, some method of co-operative handling of export credits must be devised or the United States will lose its golden opportunity to be a dominant factor in the world's markets.

While the average AMERICAN BUILDER reader may not think that he is interested in this question of greater export business for the United States, he is interested, and vitally, too. For upon the prosperity of the country depends the prosperity of the building business. With our manufacturing facilities greatly increased over normal by the demands of war, and millions of dollars tied up in plants that must be productive, it is necessary for Americans to seek other markets than their own country provides. That market will be found in foreign countries, and the means to supply these markets should be devised as quickly as possible.

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"Own Your Own Home" Expositions

A PRE-SEASON stimulus for renewed building activity this coming spring is shown in the plans now actively under way for "Own Your Own Home" expositions in several large cities.

Under the direction of the Builders Exchange in Minneapolis, arrangements are being made for an exposition in the Armory early in February. Building material, supplies, equipment and furnishings of all kinds will be exhibited.

March 26th to April 2nd a big exposition will be held in the Coliseum at Chicago. Every commodity used in home construction will be shown, and experts in different lines will be there to offer suggestions to the public.

Perhaps the largest exhibition of the year will be held in New York, April 16-30.

The Chinese Carpenters Whipsaw the Timbers to the Proper Dimensions on the Job, Using Crude, Heavy Saws. This Photograph Was Taken in Pekin, and Shows a Carpenter at Work with the Heavy Saw, Shaped Much Like a Rifle.

Our front cover COLONIAL HOUSE

DID you ever go into a magnificent appearing home, an architectural masterpiece, in which ever ystone and every piece of material in its construction impressed you with the sheer power and grandeur, in which every door-knob commanded your attention to its regal presence, and the carved and highly finished woodwork stood forth as the emblazoned coat of arms on a royal dwelling—and yet feel lonesome and disappointed?

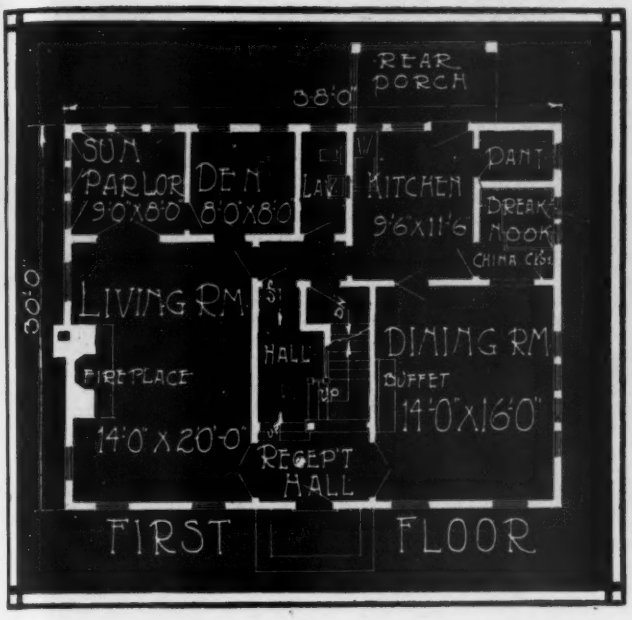
And then on the other hand, did you ever go into a humble, modest, but charming, little home of some plain material with a pleasing and hospitable exterior, inviting front porch, attractive, beckoning entrance, cozy and comfortable living room with large warm fireplace, simple but excellent woodwork, and compact little kitchen in one end with an intimate, cozy breakfast nook nearby — and feel glad and wish to stay a while?

Certainly you have. And why? Because one was a monument to the skill of the builder — the other was a home in all the meaning of the word. In that large pretentious house, the architect had spent his talent and genius building a structure, beautiful and perfect in its completness, baffling in its impressiveness, but cold and austere in its appeal. He had created a technical masterpiece, but a failure as a home, for he had forgotten the greatest appeal of all—sentiment. Without the home atmosphere it is as barren as the "desert waste," and bleak as compared to the "humble thatched cottage on the moor."

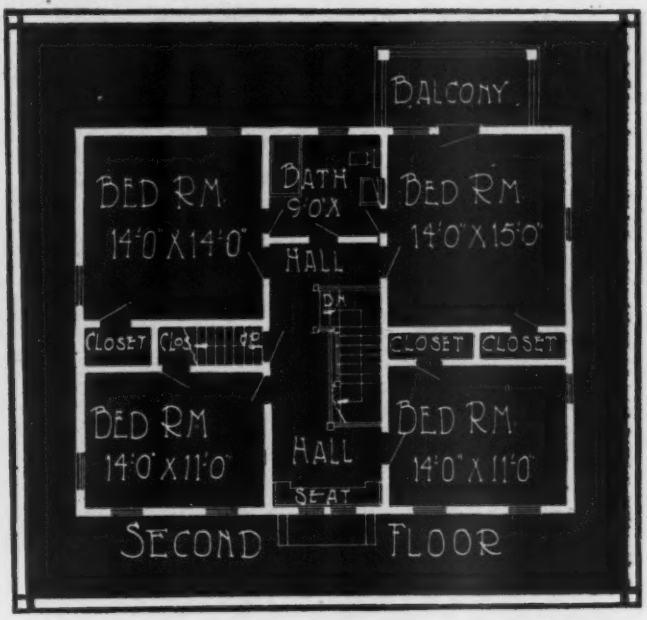
We are happy indeed that the architect who designed the delightful house shown on the front cover was touched by the divine spark which renders things not only beautiful but appealing. Despite the fact that it is practically the oldest architectural type in the country the Colonial house has not diminished one whit in popularity. In fact, during the last few years it has increased with leaps and bounds in the favor of the homebuilding public. This remarkable condition can be attributed largely to its dignified yet modest appearance and true home atmosphere which it conveys. You cannot look at one of these Colonial design homes without feeling the irresistible appeal which it sends forth, the comfort, cheer, and coziness which is embodied within its walls.

"She's Waiting for Her Daddy." There's Plenty of Sunshine in Her Smile Because She Has a Happy Home and Delightful Surroundings. Early Environment Determines in Great Measure the Future Disposition of the Children. Why Not Raise Them in a Cheerful Home Like the One Described Here?

Of course it should by no means be understood that because the exterior design is similar to the homes of the first settlers and builders of the nation it is still the same type of house thruout. Nothing could be farther from



First Floor Plan of Front Cover Colonial House, Showing Efficient Arrangement of Rooms and Unusual Comfort Provided. Note the Large Living Room with Fireplace and Cozy Breakfast Nook.



Second Floor Plan, Showing Bedrooms and Bath. Each Bedroom Has Exceptionally Ample Closet Room and Is Well Lighted and Cheerful. This Home Contains Seven Rooms, Three on the First Floor and Four on the Upper Floor.

the truth. Architectural skill has preserved the home-like appearance and quaintness, but has added all the conveniences which make the modern American home the marvel and envy of the world. This house stands as a link between the old and new.

Dignified in its simplicity, the Colonial home shown on the front cover presents a most attractive picture of what real home comfort should be. It has all the distinguishing characteristics of its type, the gable roof with broad eaves, the wide clapboard siding, charming entrance, big white door and arched hood, and quaint brass knocker. There is the low brick landing with its embellishing flower pots and lattice work about the door.

There are the usual small paned windows with their inevitable shutters hinting of a certain home privacy that only a house like this can insure. The house lends itself very readily and beautifully to garden landscape decoration and the addition of a hedge, as shown here, is a decided improvement. Likewise in building fences or a garage in the rear it is wise that the builder keep the general scheme in mind and build the additional structures in harmony. An incongruous small building will do much harm to the general appearance of an attractive home.

Colonial houses are built with the long dimension facing the street. In this case the building is 38 feet wide and 30 feet deep.

One of the essential features of a real Colonial home, in fact as inseparably connected with it as the green shutters and old-fashioned entrance, is the large living room. Without this living room of spacious dimensions, the house would not be true to its label. Here the living room is 14 by 20 feet, a great, comfortable lounging place for the family, well lighted by windows on two sides, with an open brick fireplace adding cheer, warmth, and hospitality. It is located on one side of the small reception hall which also opens into the dining room on the opposite side of the house and leads to the staircase which winds upstairs.

The dining room, slightly smaller than its companion room, is 14 by 16 feet and furnished with a built-in buffet. A large triple window on the side in addition to the two broad front windows provide exceptionally good light.

To the rear of the dining room is the kitchen, a typical example of the modern tendency in home construction. It is small, compact and complete in contrast to the kitchen of our forefathers. Great awkward high ceiling affairs they were—a constant source of unnecessary work. Of course, years ago when domestic help was cheap and plentiful this item did not worry the housewife much, but today conditions are changed—help is a luxury. To help the housewife who is now forced to do her own housework, the builder cut down the size of the kitchen and made it as complete and as efficient as possible. In this work he has been aided by the vast number of new labor-saving electrical devices and built-in features.

A cozy intimate little breakfast nook adjoins the kitchen and is very convenient for breakfast when the work of serving in the dining room is unnecessary. A large pantry is also provided.

The remainder of the first floor is divided into three rooms which have helped immeasurably in making the modern home ideal from the comfort standpoint. They are the sun parlor, something unknown in the days of Colonies, an American innovation in the building field; the den, a small room 8 by 8 feet, a quiet retreat where the head of the family can carry on his work undisturbed; and the extra lavatory.

The upper floor is given over to sleeping rooms and bath. Each bedroom has exceptionally large closets and all have double window exposure. In the con-

"A Proud Little Miss"—She Has Every Reason to Feel That Way. Just Take a Glance at the Cozy Corner in the Nursery in Her Home. Beautiful Rooms Like This Have a Profound Effect Upon Young Minds. The Future of the Nation Depends on the Young Generation of Today. That Is Why Happy Homes Are Needed.

struction of a home, the builder must not forget the essential feature of the healthy bedroom, plenty of fresh air. To provide for this he should plan as many windows as possible. The bedrooms in this home vary in size, two being 11 by 14 feet, one 14 feet square, and one 14 to 15 feet. As the dimensions indicate all are very comfortable.

Aside from the actual construction of a home like this, there are many other factors which the contractor and builder must take into consideration. There is the basement excavation, laundry, heating plant, and other equipment which now are considered essential in a real home. In all his planning and actual work he must always keep one thought uppermost in his mind—ultimate comfort and satisfaction of his client; he can rest assured that this result can only be gained by applying the best practice and latest methods in building which change greatly within short periods of time. To be a successful home builder requires a persistent study of the developments in his field and intelligent application of this knowledge.

✣

STEEL which has been rusted can be cleaned by brushing with a paste compound of ½ ounce cyanide of potassium, ½ ounce castile soap, 1 ounce whiting, and water sufficient to form a paste. The steel should be washed with a solution of ½ ounce cyanide of potassium in 2 ounces of water.

Billions for Construction in 1921

EARLY resumption of home building and other forms of construction is assured if contemplated building projects may be taken as a criterion for the coming year.

Contemplated building projects for the territory north of the Ohio River and east of the Missouri will probably reach the tremendous amount of $4,800,000,000, which under normal conditions would indicate actual construction during 1921 of approximately $3,200,000,000.

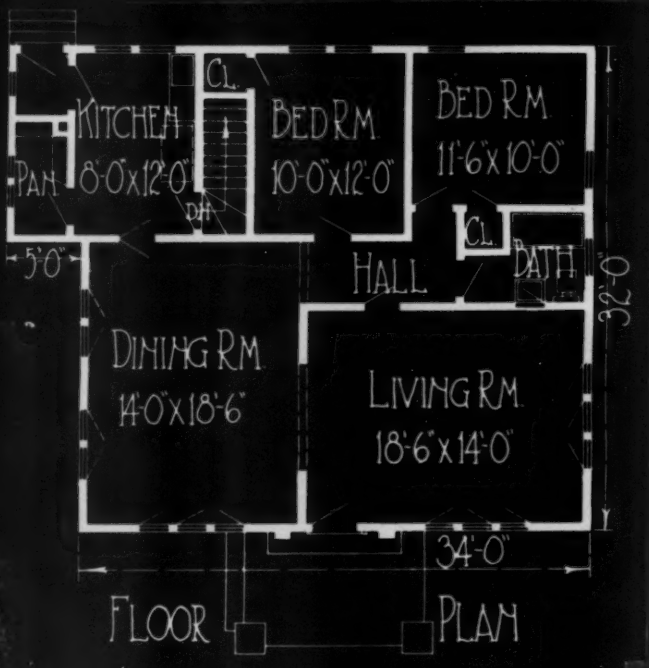
The tendency downward in the building material prices now prevailing paves the way for a big reduction in building costs. Thousands upon thousands of homes, so badly needed, will be built under these conditions. This will necessarily call upon thousands of men from all trades for the production of building materials.

Such demands will naturally lead to steady production and universal employment, which, in turn, will make for better business activity and general prosperity.

✣

PAINT may peel from any one of several causes, but the most frequent cause is the improper application over a damp or frosty surface.

Cozy Five-Room Bungalow



COZY, HOSPITABLE, FIVE-ROOM BUNGALOW. A most charming little home with its delightful inviting entrance and well-designed exterior. It embodies an excellent combination of charm, substantial construction, and efficent floor plan arrangement, and should prove irresistible in its appeal to home-lovers of all types. The artistic front entrance, set under a gabled hood at the rear of the well-balanced terrace, beckons the passerby to a comfortable, attractive home within. There is found a large living room, 18 feet 6 inches by 14 feet, dining room, two bedrooms and a kitchen. The arrangement is one that should satisfy any housewife; for each room has received its proper emphasis and is not awkwardly large or inconveniently small. The bungalow is 34 feet wide and 32 feet long.

Woman and the Home

Building the House of a Thousand Comforts

MILADY MUST DECIDE MANY IMPORTANT PROBLEMS FOR CONTRACTOR WHEN DRAWING UP PLANS FOR NEW HOME

By Grace T. Hadley

AFTER choosing and building the home, furnishing it and seeing that the plumbing is in order, planning for the labor savers becomes the most important next step. An enormously large proportion of American housekeepers employ no regular servant and many call in assistance only for the washing, ironing and heavy cleaning. A lady who went to call on a friend in a well-known suburb of New York put the question: "Well, Martha, what is new?" "Nothing is new," remarked Martha, placidly, "excepting that every woman I know is doing her own housework and is trying to plan to do it with the least amount of drudgery."

Women who never did their own work before are doing it now, because it is possible to do much of the cleaning with ease and speed, to cook meals right at table with the aid of electric grills, toaster, percolators, even to entertain in the evening, with the aid of an electric chafing dish. There is no longer the need for going into the kitchen, donning a kitchen apron to prepare a light repast or to make a pot of coffee.

The best means for making kitchen and laundry work easy compared with old ways of doing it, is to have the right tools or appliances. Daily work should be scheduled, by writing down daily tasks such as washing dishes, meals, cleaning rooms. Arrange these tasks in the right order for them to be done. The modern electric cleaner has simplified the cleaning task almost beyond belief and working with it one does not have the feeling of being a drudge.

Right Appliances for the Work

Kitchen conditions should be standardized, working surfaces should be the right height, the range, table and sink should be placed so as to eliminate useless steps and much recrossing. If one has lived in an old house where many steps were unavoidable and then suddenly moved into an apartment or a smaller, well planned, more convenient house, the saving in steps is more than noticeable, on the part of the women folk, who have begun to take some account of their time.

Dishwashing is a task dreaded by many women who have not been doing their own housework always. It is indeed interesting to note the development in the modern dish-

Will Servants Eventually Become an Extinct Species Like the Mastadon and Other Prehistoric Animals? If Builders Keep on Installing New Labor-Saving Devices at the Rate They Are Going, It Looks as If Such a Thing Will Come to Be.

washing machines. In a previous article, a dishwasher with a table top was featured, which affords a practical working surface when the dishwasher is not in use. Then, too, the old practice of washing dishes three times daily is being abandoned, once a day being considered sufficient in the average home that has a dish-washing machine.

Another new development along this line is a porcelain enamel dishwasher and combination sink. Thus the dishes are washed right in the sink where it has been the custom to wash them, but the wishwasher is combined with the sink and a one-quarter horsepower motor does the work. Inside the washer there are two perpendicular reels which forcefully throw the water to the center of the bowl, all thru the dishes, but the dishes remain stationary and after rinsing they are then lifted out of the bowl onto the porcelain drainboard.

Many Women Who Never Did Their Own Work Before Are Doing It Now Because It Is Possible to Do It with Ease and Speed. Washing Machines, Electrical Kitchen Appliances, and Other Devices Have Chased "Old Man Drudge" From the Household and Have Given Women a New Interest in the Home.

The Home Laundry

The home laundry should be properly designed and equipped with appliances that will help materially with this division of the housework. Formerly, a basement room, whitewashed, a small laundry stove, a couple of wooden tubs, a scrubboard and plenty of elbow action on the part of the laundress were the essentials of the home laundry. Today the equipment is different.

The room in which the laundry work is done should be of sufficient size to accommodate two stationary tubs, a modern electric washer, a big ironer, a combination skirt and sleeve board, a couple of electric irons, an indoor dryer for use on wet days and a table. The room should be well lighted and ventilated.

An average family of five people would require a family-size electric washer and wringer with capacity for washing eight bed sheets at one time. An electric ironer provides facilities for doing at least 90 per cent of the ironing with about one-tenth of the toil of former days. A new ironer that has recently appeared on the market has a ruffler so that ruffles and frilly things can be done as well as the flat pieces.

Then clean linen in the home in abundance depends upon: First, the selection of appliances best suited to the particular family using them; second, on the best possible arrangement of the equipment; third, on careful instruction of the operators in the proper use of the new appliances; fourth, proper care to keep the appliances in working order; fifth, on sanitary conditions such as good light and ventilation and space to work in.

Electrical Convenience in the Bedroom

In the bedroom of the house of a thousand comforts, there are a number of electrical con-

No Need for Working Clothes Under the New System of Things. Electrical Apparatus of This Kind Calls for Plenty of Outlets Located in Advantageous Places About the Home. This Work Is the Chief Concern of the Builder.

veniences, first of all the electric vibrator, electric curling iron, a hair dryer, and the adorable boudoir lamps. There is a heat pad to take the place of the old-time hot water bottle, and a small electric water heater in case of sudden illness. There is an outlet for the electric cleaner so that rugs, curtains and drapes of all kinds can be easily cleaned. The room is provided with inter-phone connections to all parts of the house to save unnecessary steps. Most interesting of all, perhaps, is the electric switch which, when needed, lights every lamp in the house. Such a flood of light is a better guardian than a night watchman.

Within the Wonder House

The living room of the modern home is far more comfortable than the "parlor" of other days. It is furnished with an eye to comfort and lighted by portable lamps, very prettily shaded, or by side-wall brackets provided with eye-shields. An electric fireplace of the luminous radiator type may furnish sufficient light to sit by during the long evenings and it will radiate an agreeable warmth. A portable lamp supplies local illumination as needed. Some people still prefer "firelight" for subdued general illumination and a lamp beside chair or table for reading or study work. Brilliant illumination is desirable only when there is a brilliant social function.

Convenient outlets provide for additional comforts such as a fan for summer days, the electric piano that will provide music without human aid, or the newest phonograph that operates itself and plays 10 records in succession.

Beyond the living room is the dining room equipped with its useful and pretty array of appliances that have proved themselves such able helpers.

There is a certain basis of electrical installation, such as light in every room, one baseboard outlet for vacuum cleaner in both upper and lower halls, two outlets in living room for fan and portable lamps, that may be adequate for bare necessities, but nowadays no one knowing the convenience of complete electric service in the home would willingly plan to limit the installation to such small scope.

Why Worry About the Temperature in the Apartment or House? This Little Thermostat Does All That and Insures Comfort by Providing Steady Heat. The Modern Home Has Become the "Wonder Home" in Every Sense of the Word.

Garages Delivered to Owner by Auto Truck

By C. E. Rogers

GARAGES, ready to use, delivered at your door at absolute cost—that's what motor car owners in a Kansas town have to face. They aren't complaining of the high cost of building material either, for the building material in these garages was bought before the present high prices came. The Kansas State Agricultural College, Manhattan, sells them. They are made by students of carpentry, who get nothing for their work except experience and college credit—which is all they want.

Service De Luxe. This Garage Is Built and Delivered by the Student Carpenters at the Kansas State Agricultural College, Manhattan, Kas. They Get Nothing for Their Work But Experience and College Credit.

The one shown in the illustration was built, painted and delivered to its owner's foundation for $300. Others sell as low as $200—the material alone in them being worth 50 per cent more at present prices. The big army truck, one of a fleet lent to the college during the war, delivers the ready-built garage anywhere in the city—and no extra charge for delivery, thank you.

✣

TO clean brass, mix in a stone jar one part of nitric acid and one-half part of sulphuric acid. Dip the brass into this mixture, wash in water and dry in sawdust. If greasy, first clean the brass by dipping in a strong solution of potash, soda and water, and wash thoroly in water.

Building the House of Brick

METHOD OF LAYING COMMON BRICK IN BUILDINGS, FIREPLACES, CHIMNEYS, SIDEWALKS, FOOTINGS, ETC., SHOWN IN DETAIL ON BLUE-PRINT PAGE 93

"NEITHER frost, nor fire, nor flood, nor time can destroy well-burned clay" is what many prospective homebuilders think when they plan to build a new home. That accounts for the great popularity of the solid brick house. Common brick is made of clay and varies in color according to section or degree of burning. Recently the size has been standardized by the manufacturers and is now made 8 by 2¼ by 3¾ inches.

One of the important factors in common brick construction is the mortar. There are several kinds in use—of these portland cement and cement-lime mortars are used the most extensively. Lime mortar is generally used in house construction while portland cement mortar is used in walls and piers carrying heavy loads. Both must be mixed and used immediately because cement obtains its initial set very quickly.

The thickness of brick walls is determined largely by the building codes in the various cities, but as a general rule in dwellings the basement walls are three bricks or 12 inches thick. For two-story buildings with or without attics the first two story walls are generally 8 inches thick. The safe loads for brick walls vary from eight to fifteen tons, depending on the mortar used.

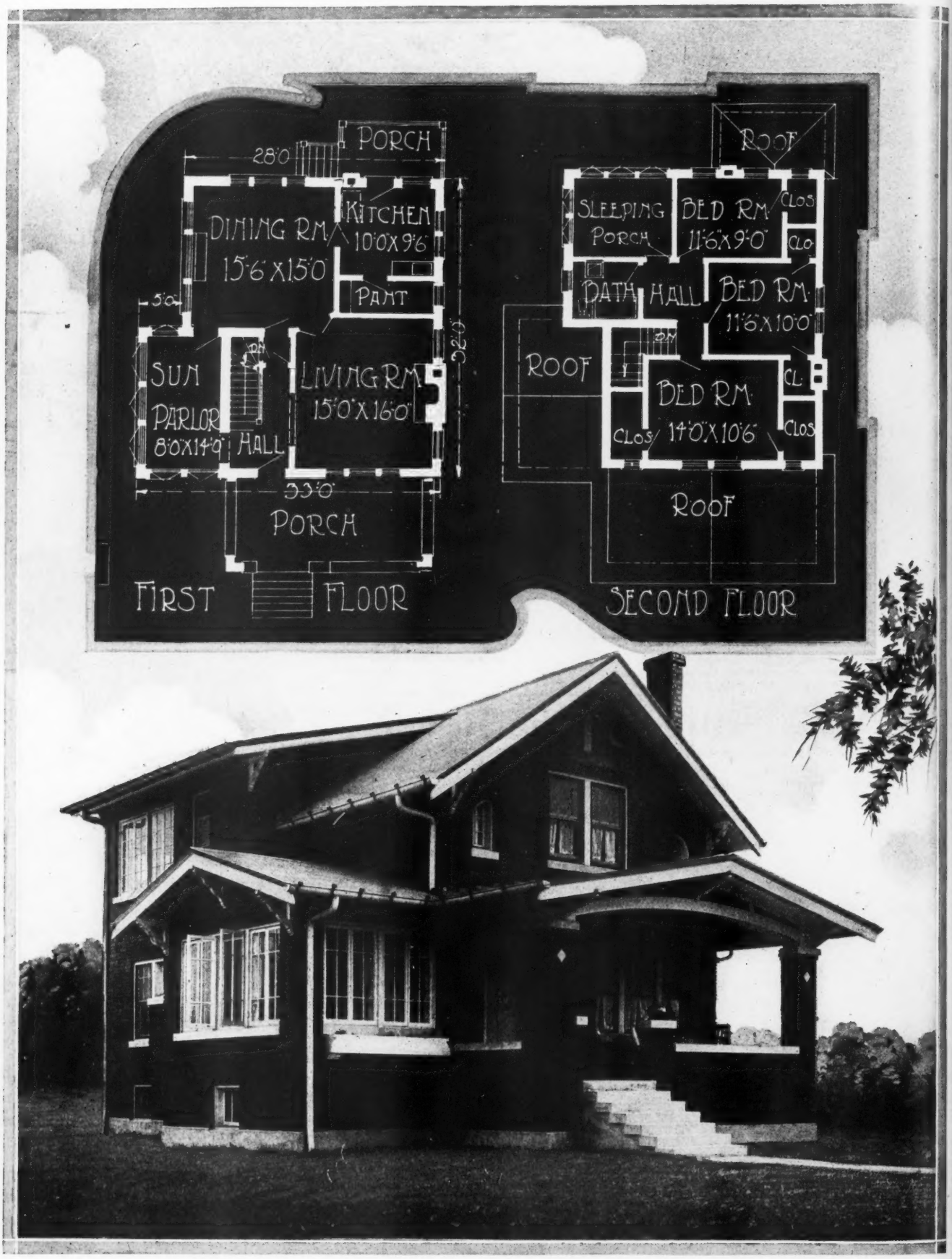
Altho plaster has been applied with success directly to brick walls it is always advisable to use furring. Metal lath, gypsum plaster board and ordinary wood lath are all available for this purpose.

Footings are particularly important in brick work. The excavations should be leveled carefully and brick selected for hardness. The footing should be wider than the wall to spread the load. Details of this construction are shown on page 93 in blueprint form. In laying brick the bricklayer always works from the inside pointing the face as he goes. Every fifth course should be a header course.

There are several important bonds and joints in brick construction which call for special attention. Common bond is the one most frequently used because it is the cheapest and easiest laid. In building a wall in common bond the first six courses are stretchers and the seventh a header course. In a 12-inch wall the seventh course is a header course, both in front and back of wall. Common bond is used in backing up a wall laid with a more expensive bond on the face.

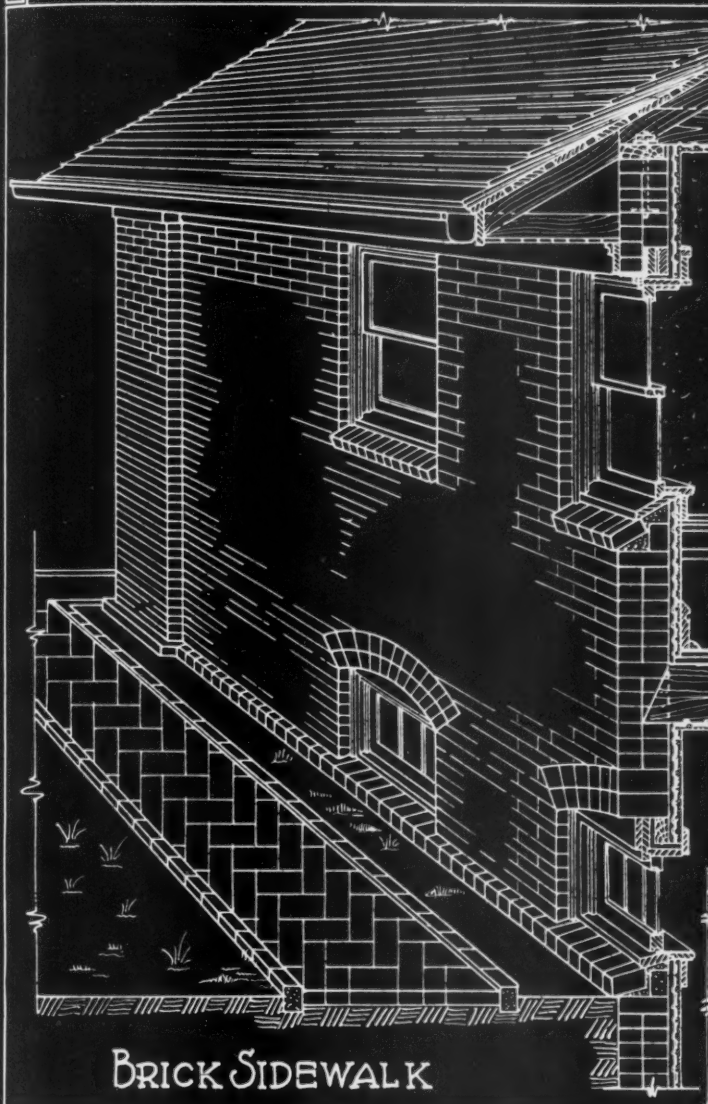
English bond calls for alternate header and stretcher courses. It is used only for special effects. Flemish bond is laid with headers and stretchers alternating in each course. The joints most frequently used are the plain cut, struck, raked and V-shaped.

Substantial Brick Residence with Common Brick Details



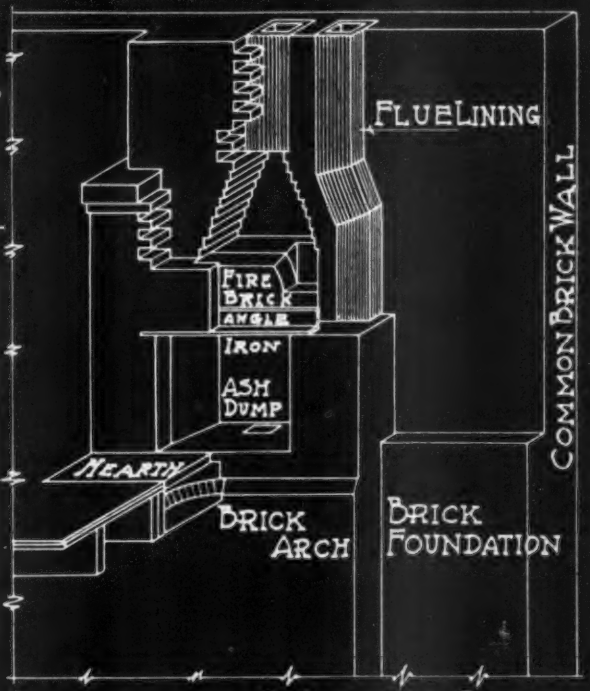
EXCELLENT TYPE OF SUBSTANTIAL BRICK RESIDENCE. Rather unusual in design, it has many features that commend it to the homeseeker. The many variations in elevations and white rafters as contrasted to the dark brick background give it an ornamental appearance that is decidedly pleasing. Brick construction details are shown on the opposite page. The features of this charming home are the sun parlor wing with its casement windows and sleeping porch on the rear of the upper floor.. The interior is quite cozy and contains six rooms, three on each floor. On the first floor are the living room, with open fireplace, dining room with door leading to sun parlor which can very conveniently be used as breakfast room, and kitchen with a large pantry in addition. Upstairs are three comfortable bedrooms, exceptionally well lighted, bath, and sleeping porch, mentioned above. The house is 33 by 32 feet.

RECOMMENDED CONSTRUCTION

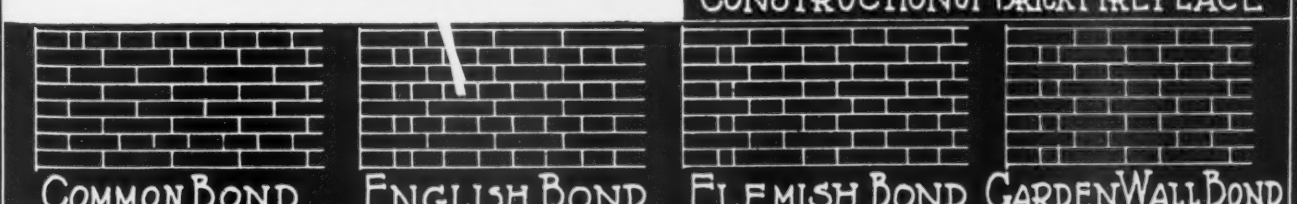


BRICK SIDEWALK

SECTION OF BRICK COTTAGE



CONSTRUCTION OF BRICK FIRE PLACE



COMMON BOND ENGLISH BOND FLEMISH BOND GARDEN WALL BOND

COMMON BRICK CONSTRUCTION

How to Build the Foundation

THE MOST IMPORTANT STRUCTURAL PART OF EVERY BUILDING—VARIOUS TYPES OF CONCRETE FOUNDATIONS DESCRIBED

By A. J. R. Curtis

IT is safe to say that the majority of difficulties with walls of small and moderate size buildings go back to the foundations. Build a good foundation and no matter how or of what material the superstructure is built, its life will be lengthened and its maintenance reduced.

The principal requirements for a good foundation are that it support, without movement, the loads imposed by the earth and by the building above and that it keep the basement or cellar absolutely dry. Concrete or masonry foundations of residences and other buildings of moderate size usually have been found capable of supporting the superimposed loads, but not infrequently moisture has been admitted thru walls with considerable annoyance and occasionally with loss. As far as watertight foundations are concerned, it is far easier to construct satisfactory walls to begin with than it is to repair a wall which has developed passages thru which moisture may enter the basement.

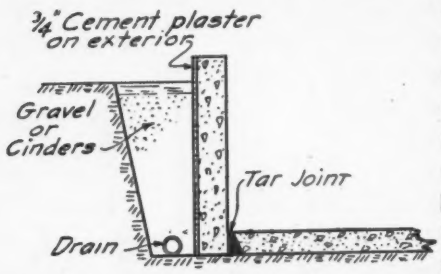


Fig. 1. The Most Important Considerations in Making a Monolithic Concrete Foundation Watertight Are: (1) Dense Mixture of Quaky Consistency Carefully Spaded as Placed in the Forms, (2) Cement Plaster or Hot Tar Coating on the Outer Surface as an Additional Precaution, (3) Provision of Adequate Drainage Presumably by Means of Tile, and (4) Laying of a Strong, Dense Floor with Wedge Shape Tar Joint Between Wall and Floor. The Joint Shown in the Above Sketch Is Considerably Enlarged, the Actual Joint Seldom Being Made with Maximum Thickness Greater Than 1 Inch.

No difficulty is experienced with leaky foundations on high ground except in heavy clay soil where water from gutters or downspouts may run down and be trapped next to or under the foundations; the most difficult situation to handle occurs where the foundation is continually surrounded by water under a head. Concrete has become, without question, the most popular material for foundations, because its use has been demonstrated to be the most economical, as well as the most certain method of keeping out dampness. No matter how favorable local conditions seem to be, it is the part of good judgment to construct the foundation so that it will withstand a head of moisture equal to its height. It is not difficult to do this, employing either monolithic or concrete block construction.

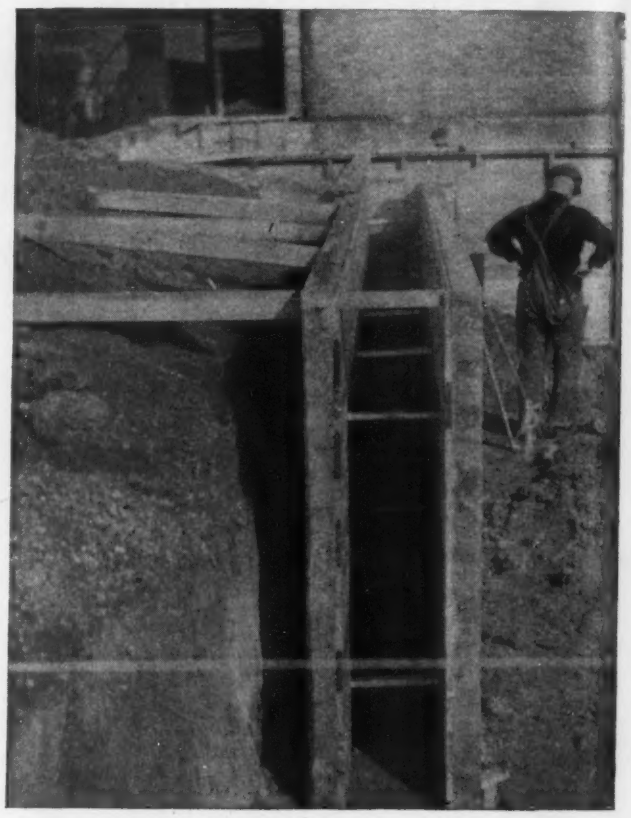


Fig. 3. Form for Monolithic Foundation Showing Spacers and Tie Wires in Place, with Surfaces Vertical and Parallel. Braces Are in Position on the Left Side of the Form, But Have Not Been Placed on the Right Side.

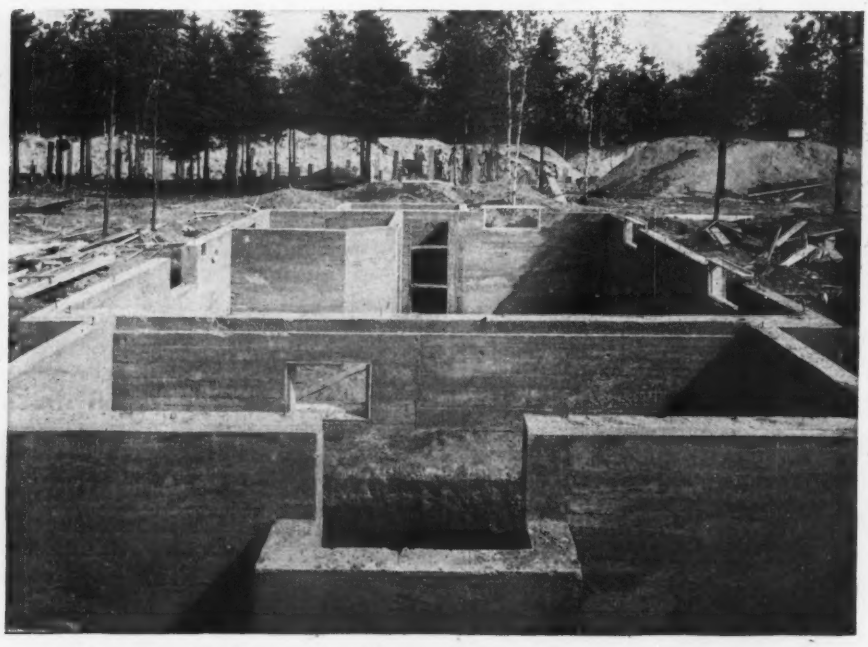


Fig. 2. Monolithic Foundation for a Residence of Frame Construction. The Walls Have Not Yet Received the External Cement Plaster Coat. Notice the Bolts Imbedded in the Top of the Foundation, to Receive the Wooden Sills.

Monolithic Foundations

To prevent the possibility of heaving, foundations must go below frost penetration. The forms,

which may be either of wooden or metal construction, must be practically watertight and securely braced. Immediately before concrete is deposited, the forms should be carefully inspected to make sure that all parts are properly tied and braced, so there will be no bulging or other movement of the forms when or after the concrete is deposited. Where feasible, it is best to set up forms for the entire foundation and deposit all concrete at one continuous operation. The concrete should be mixed in the proportion of one sack of cement to 2½ cubic feet of sand and four parts pebbles or crushed stone. A one-yard batch of this combination requires 5½ sacks of cement, 14 cubic feet of sand and 22½ cubic feet of pebbles or stone.

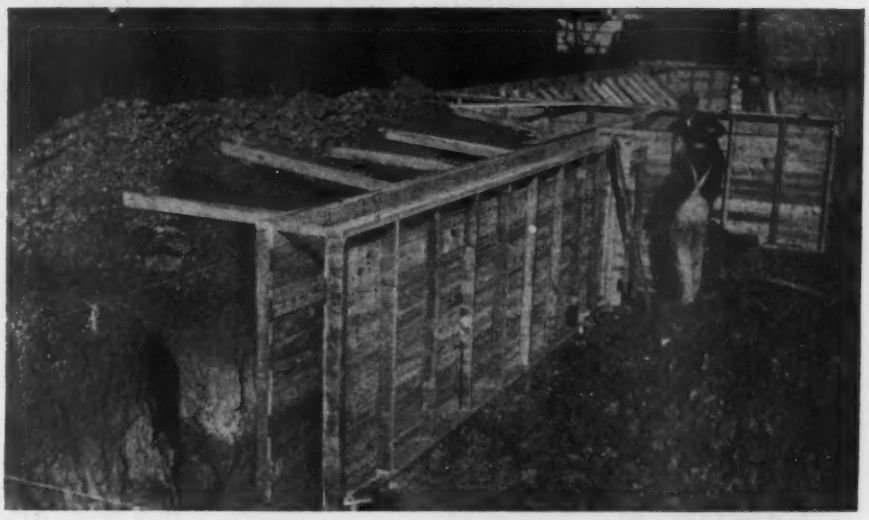


Fig. 4. Another View of the Forms Shown in Fig. 3, Showing Tight and Smooth Construction of Form Surfaces to Prevent Leakage and to Produce Smoother Wall Surfaces.

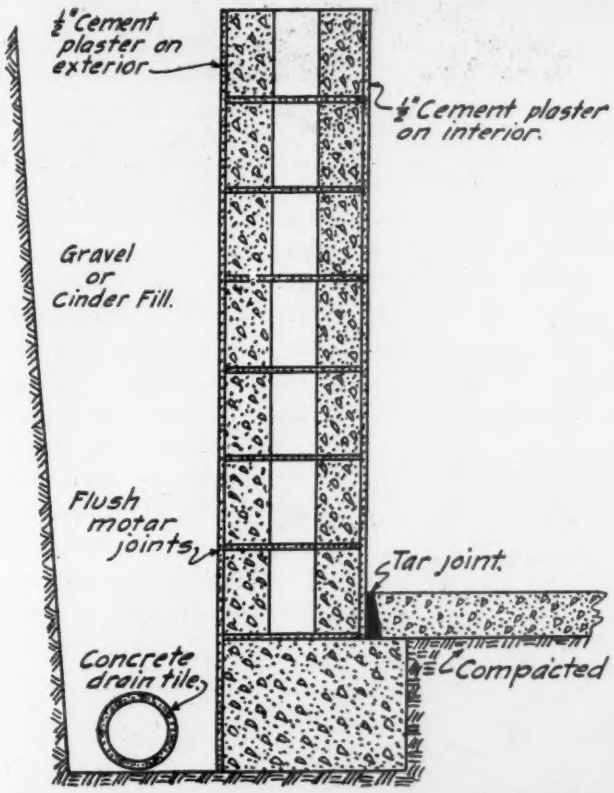


Fig. 5. Concrete Block Foundations Are Increasingly Popular Owing to the Speed with Which They May Be Constructed, Without Forms. The Block Wall Is Placed on a Shallow Concrete Footing, the Block Being Previously Drenched and Then Laid Up with Extreme Care to Make Tight, Flush Joints. Both Inner and Outer Surfaces Are Then Covered with ½-Inch Cement Plaster Coats; or, if Preferred, the Outer Surface May Be Covered with a Coating of Hot Tar or Suitable Asphaltic Preparation.

The mixing should be thoroly done with just enough water to produce a plastic (quaky) mixture. Machine mixing should continue one to two minutes; hand mixing should continue until the mass is absolutely uniform in color, consistency and general appearance. As placed in the mold the concrete should be carefully spaded to work back the larger particles and allow the finer particles to move to the surface, making the latter smooth and dense.

Should it be necessary to discontinue operations before all of the concrete is deposited, stop work with the top of the concrete as nearly level as possible, leaving the surface corrugated or roughened and irregular. Always protect the top of the work against dirt or other foreign substance and particularly against drying out. If surfaces on which fresh concrete will be placed have dried out to any extent, it will be necessary before depositing more concrete to drench the surface and paint it with a creamy mixture of cement and water, immediately followed by ¼-inch of cement and sand mortar. The concrete must then be placed on the mortar.

On the removal of the forms all pockets or blemishes on the surfaces of the foundations should be filled with cement mortar, and fins and other projections removed

Fig. 6. Erecting the Forms for a Foundation Footing. The Footing Is of Concrete Deposited in Place, and in Residence and Other Small and Moderate Building Construction Is Usually Made 12 Inches Deep and 16 to 24 Inches in Width, Depending on Soil Conditions.

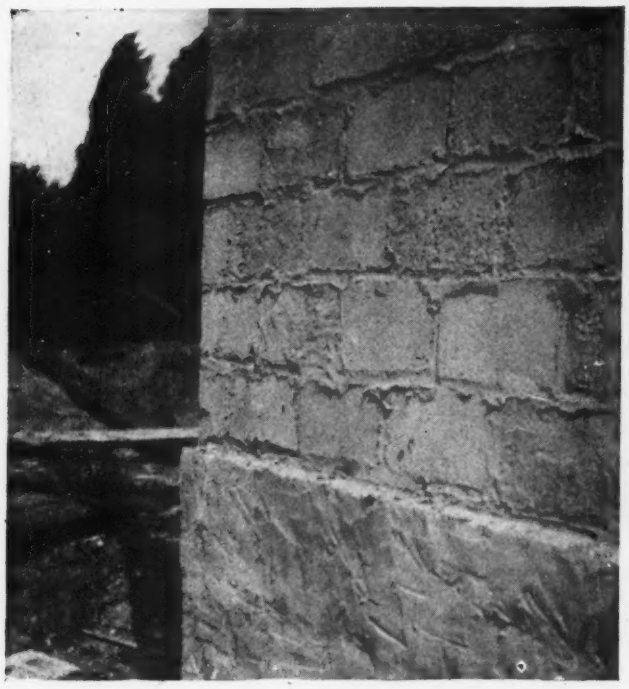


Fig. 7. Exterior Surface of a Concrete Block Foundation Covered with ½-Inch Coat of Cement Plaster, as Shown in Fig. 5. The Block Must Be Thoroly Moistened Before the Plaster Coat is Applied.

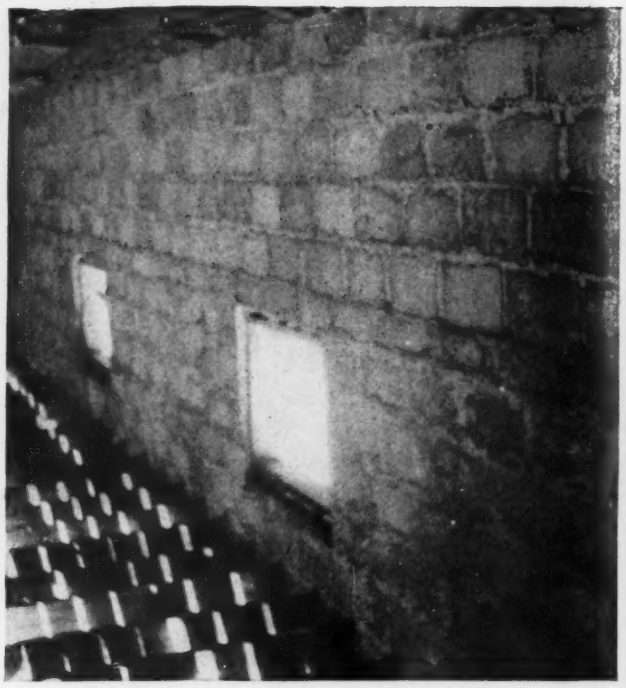


Fig. 9. Interior View of a Concrete Block Foundation Wall, Ready to Receive ½-Inch Cement Plaster Coat as Indicated in Fig. 5. Notice the Overhang of the Footing on the Interior, the Exterior Vertical Line of the Footing Being Flush with That of the Block Wall Above.

with a wire brush. Then while the surfaces of the concrete are still green, a coat of cement and water wash, mixed to the consistency of thick cream, should be applied with a calcimine or similar large brush.

Concrete Block Foundations

Foundation walls of concrete block have become very popular, owing to the speed and economy with which they are built, without the use of forms. Blocks used for foundations must show absorption of less than 8 per cent in 24 hours, as will be the case if made according to American Concrete Institute specifications (see AMERICAN BUILDER for May, 1920, page 148). The block are laid on a shallow footing of monolithic concrete, as shown in Fig. 5, constructed of 1:2½:5 concrete. The footing forms are straight pieces of 2-inch material held in position by stakes and set to a true level. The concrete in the footing is struck off leaving a rough, but level surface, and is covered if necessary in order to keep free from dust and dirt.

In moderate weather the concrete will have hardened sufficiently over night to permit laying up the block next morning; the first course of block *must* be laid before the moisture has disappeared from the surface of the footing or the usual precautions for joining new concrete to old will have to be resorted to. The first course of block is laid in a layer of 1:2 cement and sand mortar sufficiently deep so that the top of this course will be exactly level. The block must be thoroly drenched before laying, and the mortar made sufficiently stiff to support the block as laid. Top and both ends of the block should be mortared. About the thinnest horizontal mortar joints in practical use is ¼ inch for block 16 inches long and ⅜ inch for block 24 inches long. All mortar joints must be carefully pointed and made flush.

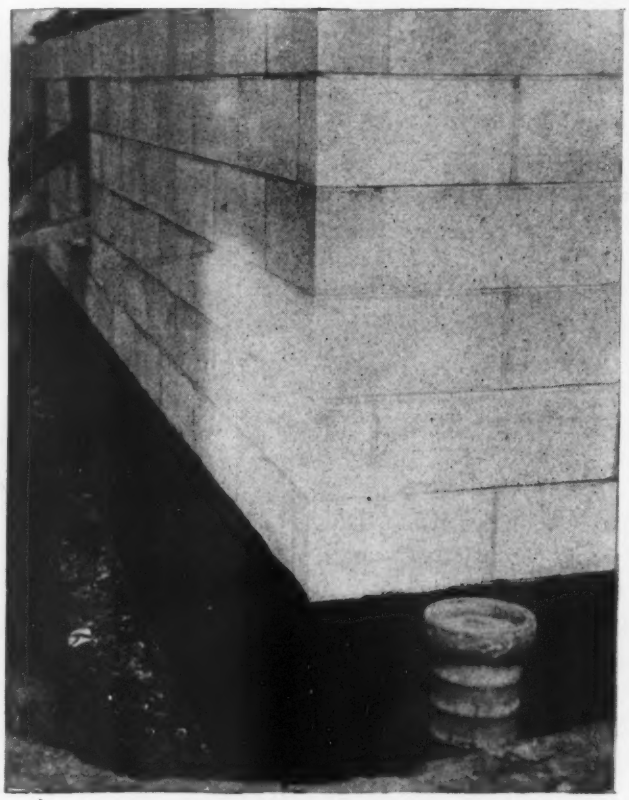
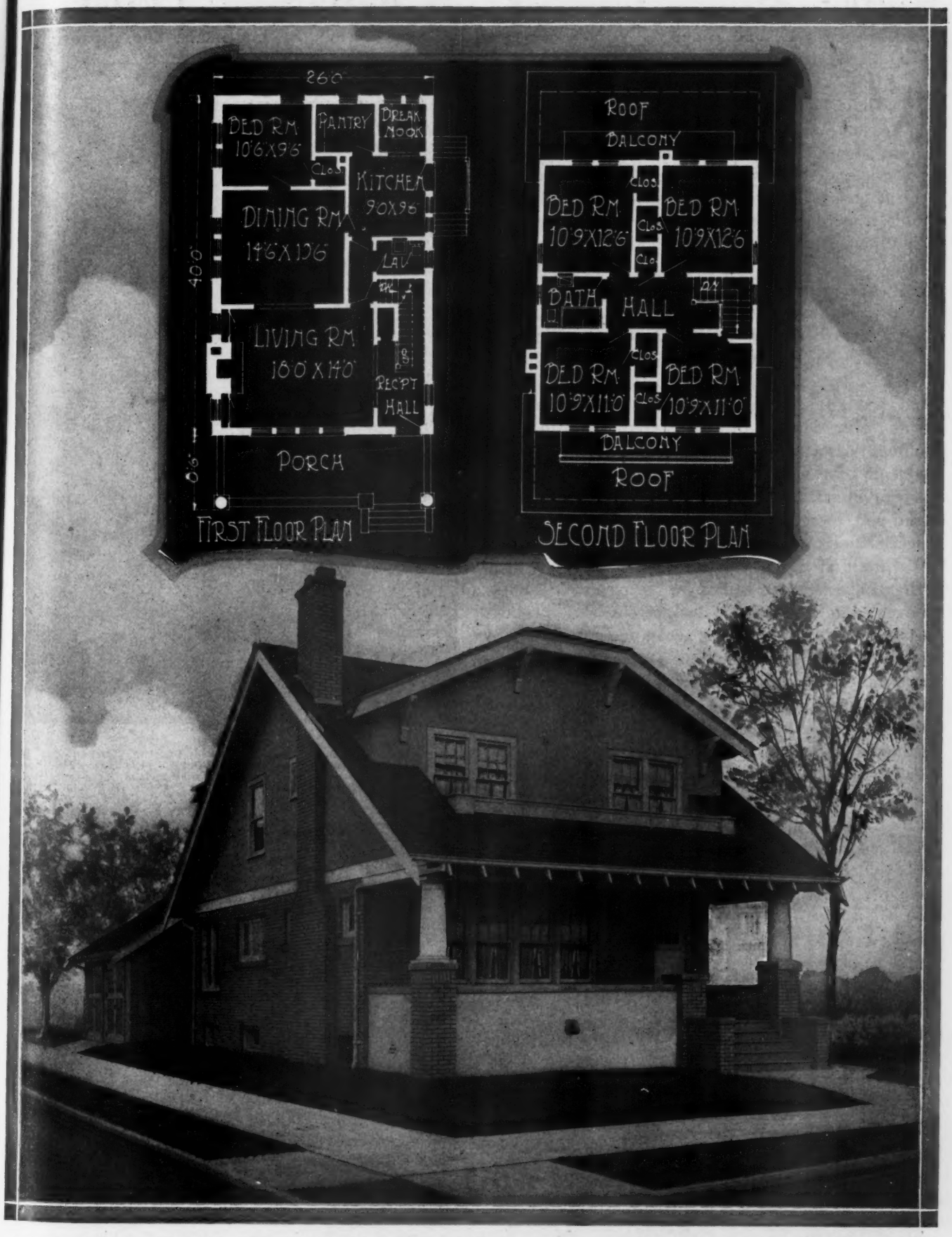


Fig. 8. As an Optional Treatment Which May Be Substituted for the Cement Plaster Coat on the Exterior of the Wall, the Application of Any Reliable Asphaltic Wall Preparation Is Recommended. Whereas the Plaster Coat Must Be Applied to a Damp Wall, Asphaltic Compounds Must Be Applied to Absolutely Dry Surfaces.

As soon as the block are laid up to the grade line, both inner and outer surfaces are drenched and a ½-inch plaster coat of 1:2 cement and sand mortar applied. As an optional treatment for the exterior surface a coating of hot tar or approved asphaltic preparation may be applied, but in

(*Continued to page 115.*)



CHARMING, SUBSTANTIAL HOME FOR THE FAMILY. Here is an ideal eight-room house with attractive well-designed brick and stucco exterior, large open front porch, and plenty of cheerful windows. The brick bulkheads, stucco faced railings, and large white pillars combine to make a clean, harmonious picture. On the first floor are the living room, dining room, kitchen and one bedroom. The living room is spacious, comfortable, and fitted with an open brick fireplace, and side wall bookcases. The dining room is not oversize and the kitchen is modeled along modern compact lines with a breakfast nook conveniently close. Four bedrooms constitute the arrangement of the upper floor. They are all well lighted by dormer windows in front and rear. This house is 26 by 40 feet.

Built-in Conveniences for Bath Room and Kitchen

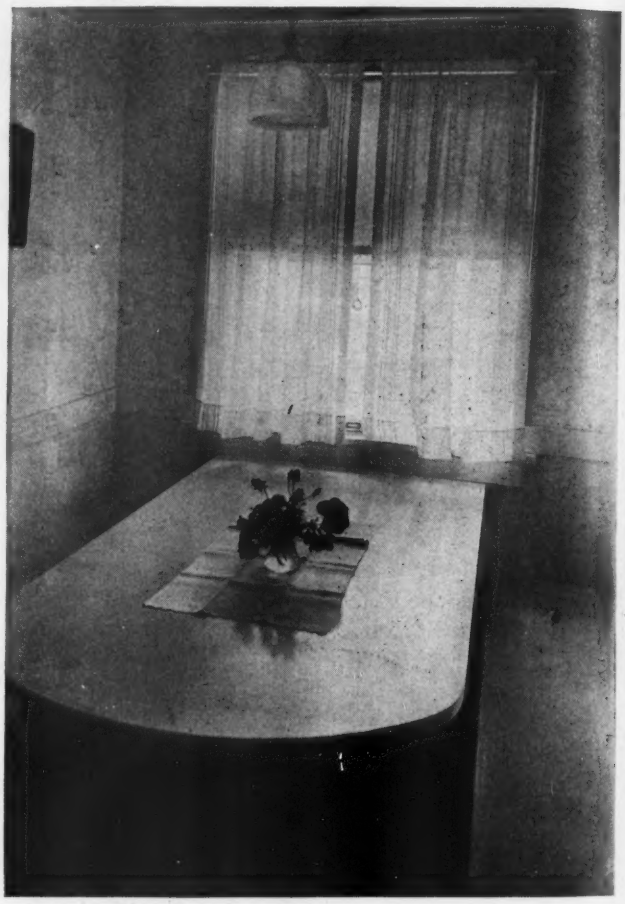
MANY FEATURES CAN BE ADDED AT ECONOMICAL COST TO LIGHTEN WORK OF HOUSEWIFE AND IMPROVE APPEARANCE OF ROOMS

By Charles Alma Byers

WHEN servants constitute so much of a luxury and are so difficult to obtain and to keep if they can be afforded, the housewife of today is especially desirous of having her home made as convenient and labor-saving as possible. She, in other words, is more interested in having a small house practically planned than a large one not so easily kept in order. Up-to-date architects and builders fully realize this, and, therefore, are devoting more and more attention toward attaining that end.

The two rooms that require an exceptional amount of labor on the part of the painstaking housewife to keep in order, ordinarily, are the bathroom and kitchen. And there are no other two rooms that more especially invite the introduction of built-in features—than which nothing, perhaps, will prove more helpful toward lightening the work these rooms entail. The accompanying illustrations and the following descriptions of them will, therefore, doubtless offer some appreciable suggestions.

In the first of these illustrations is shown a very delightfully arranged bathroom. In respect to built-in conveniences, it contains, as will be observed, a combination of features extending across the outside end of the room that any housewife will surely find especially practical. It consists, in brief, of a tall shelf and drawer cabinet at each end, a short seat with a single deep drawer underneath that links the cabinets together, and, immediately above the seat, a tall but shallow wallcase with a mirror-faced door. The cabinet in the right-hand corner has a drawer in the top, a door-concealed shelf in the center, and a clothes-chute compartment with a top-hinged door, for the conveyance of soiled linen to the basement laundry, in the bottom, while the left-hand cabinet is comprised of two drawers in the upper part and two shelves for clean linen, concealed by a pair of side-hinged doors, in the lower part. The seat includes, as stated, still another drawer, and the wallcase above, intended for medicines and toilet lotions, possesses a total of five shelves.



Breakfast Alcove or Nook, Recessed Off the Kitchen. It Is About 4½ Feet Square and Equipped with Stationary Table and Seats. This Alcove Is a Great Assistance to the Housewife and Saves Much Work.

Delightfully Arranged Bathroom, Showing Built-in Conveniences, Consisting of Drawer Cabinet on Each Side, Wall Case with Mirror Faced Door and Seat. There Is Also a Built-in Laundry Chute for Conveying Laundry to the Basement. Note the Attractive Tile Floors.

This bathroom is but 8 feet wide, and the ceiling height is 8 feet 6 inches. Each end cabinet reaches to a height of 4 feet 3 inches, and in top dimensions are 33 inches wide by 12 inches deep. The top of the seat extends about 3 inches farther

into the room, and is about 18 inches above the floor, while in length it is approximately 30 inches. The wallcase, reaching from the seat to the top of the windows, is recessed into the wall between studdings, and the shelves are about 3 inches deep by 2 feet in length.

The room, it may be added, is floored with tile, while the bathtub is also tiled in, and the walls, to the top of the built-in cabinets, are finished with a smooth, hard plaster coat and enameled. All woodwork, including the combination of built-in features, is of pine, finished in white enamel like the walls. The fixtures, incidentally, are of excellent quality and modern design, making the bathroom quite delightful in every respect.

Corner View of Practically Planned and Well-Equipped Kitchen. The Sink Has a Drainboard of Glazed Tile at Either End. Note the Abundant Cupboard Space. The Floor Is Covered with Linoleum.

In the next illustration is shown a corner of a very practically planned and well equipped kitchen. The sink, well lighted by a pair of broad windows, has a drainboard of glazed tile at either end, beneath each of which is a section of cabinetwork comprised of two small drawers and two door-concealed shelves. The sink and drainboards have a combined length of nearly 9 feet and extend outward from the wall approximately 21 inches. It will further be observed that against a side wall there is also an excellent arrangement of built-in shelf cabinets, drawers and so forth. The combination reaches from the floor nearly to the ceiling and covers wall space about 7 feet wide, occupying the whole of the end wall except for the width of a door. The upper portion is devoted to ordinary cupboard shelves exclusively, and the bottom part contains three drawers and a section of shelves, while a countershelf, with three small spice drawers at one end, extends thru the middle. Beneath the countershelf will also be observed a breadboard slide. And not shown in the illustration are a draught cooler-closet and a plaster hood for the range.

The walls of this kitchen are finished in wainscoting effect, with glazed tile, like the drainboards, and all woodwork is of pine, finished in white enamel. The floor is of pine, covered with linoleum.

The remaining illustration shows a small Pullman breakfast alcove, which is immediately recessed off the kitchen. This alcove is, in, floor dimensions, approximately 4½ feet square, containing, as will be observed, a window in the outside end. It is equipped with the usual stationary table and seats, which comprise its only furniture. The table is 26 inches wide by 3 feet 3 inches long, designed with a rounded end, and each seat, elevated 16 inches from the floor, is 13 inches deep by 3 feet 3 inches in length. The woodwork is finished in white enamel, and the lower part of the walls are plastered and painted, while the upper portion is plastered and papered. There is, of course, a small electric-lighting fixture over the table.

An alcove of this kind, by sparing the regular dining room from such constant use, materially and very greatly assists the housewife in her work and has many practical advantages.

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National Thrift Week Observed This Month

NATIONAL Thrift Week will be observed this year during the week of January 17-23. It calls for a program of economic education to help the people think straight about their money matters. It is observed in more than 1,000 communities.

Each day of this week is set aside to emphasize a special phase of thrift, as follows:

Monday, January 17, Benjamin Franklin's birthday, National Thrift Day or Bank Day.

Tuesday, January 18, Budget Day.

Wednesday, January 19, National Life Insurance Day.

Thursday, January 20, Own Your Own Home Day.

Friday, January 21, Make a Will Day.

Saturday, January 22, Pay Your Bills Promptly Day.

Sunday, January 23, Share With Others Day.

Forty national organizations including the American Bankers Association, National Federation of Construction Industries, National Association of Real Estate Boards, National Association of Life Underwriters, Credit Men's National Association, etc., are co-operating.

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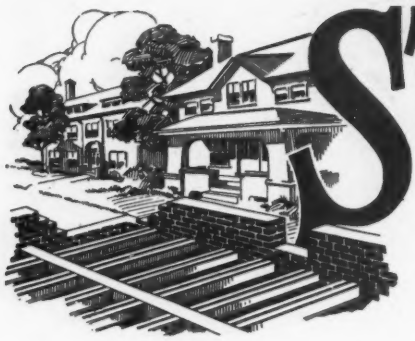
TELL us about that store front remodeling job you just finished. How many lightning rods have you installed on barns this year? How are you selling electric lighting plants and water supply systems? There are all fundamental problems of progressive builders.



STEEL LUMBER Construction

Steel Lumber Joists in Floor Construction

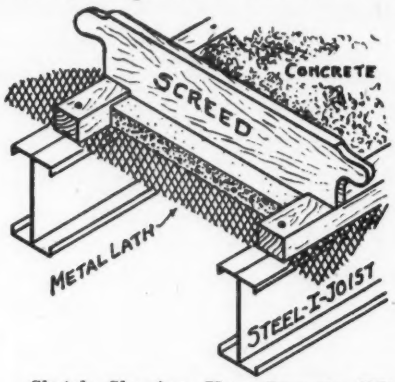
RECENT DEVELOPMENT OF LIGHT PRESSED STEEL BEAMS AND STUDS HAS INCREASED USE IN RESIDENTIAL STRUCTURES

By Gilbert Canterbury

EDITOR'S NOTE—This is the first article of a series on the use of steel lumber in modern construction. Readers are invited to ask questions pertaining to this subject. Answers to all inquiries will appear each month in this department. Write in your problems now.

CONSTRUCTION with steel has been one of the marvels of American achievement. In the structural field steel has been for many years the king of materials in the great task of spanning our wide rivers and erecting the sky-piercing buildings that have set the stamp of America on a distinctly individual architectural creation. The great American steel mill capacity of forty-five millions of tons annually is the "steel forest," practically inexhaustible, from which much of the building lumber of the future will be "cut."

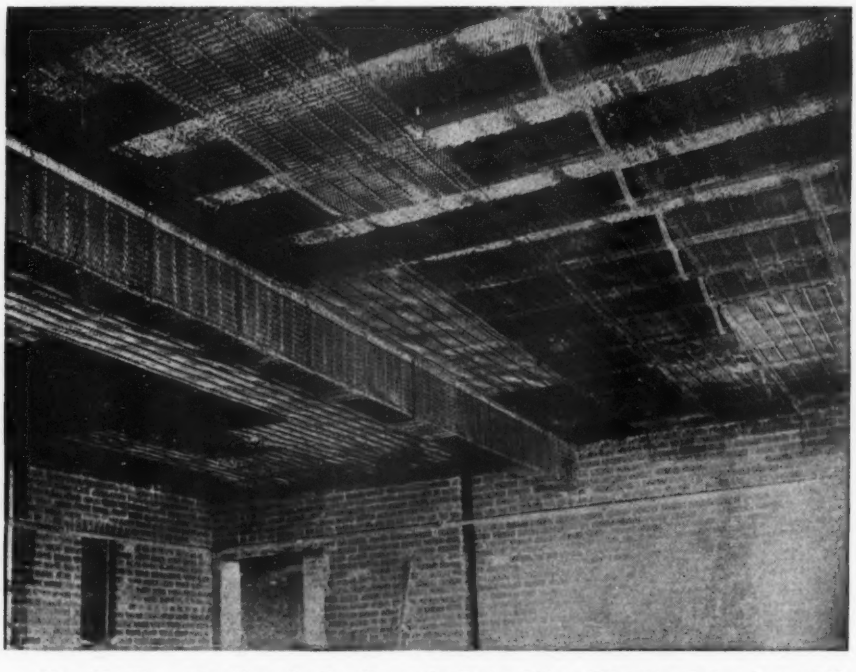
In the early period of steel activity in the building industry cast iron only was used. Then followed structural shapes of rolled steel and the third era has been led by light, pressed steel sections for joists and studs. The picture of the Bucholz residence in Omaha, Neb., appearing in this department, is an example of what is being accomplished with steel. The real heart of this splendid modern, dwelling—the frame, the bone, the part that binds the whole together—is steel. Steel lumber joists and studs pick up the light loads of floors and partitions and carry them to structural steel members. Masonry walls and asbestos roof complete, except for trim, a home strong and sturdy, sightly, sanitary and fire-safe.



Sketch Showing How Concrete Fill Is Applied. A Thick Mix Is Used and Can Be Spread Over the Lath Roughly Without Going Thru.

Another photograph is a close-up view of a floor section from the under side. This view was snapped in an Ohio grade school house and gives several interesting details of steel lumber floor construction. Brick bearing walls are indicated and one structural steel supporting beam is shown. Steel lumber joists span the panels. This underview shows diamond mesh, expanded metal lath clipped to the joists with spring clips in readiness for ceiling plaster. Metal strap bridging for the steel joists is also shown at one place in the picture. Fire-proofing treatment for supporting beam is shown. This beam has been furred with one-inch channels and wrapped with the diamond mesh lath. A cement plaster will be applied and the furring will hold this plaster away from the beam, providing a scientifically established fire-proofing.

School buildings following this type of construction have been erected in nearly every state in the union during the last few years. It

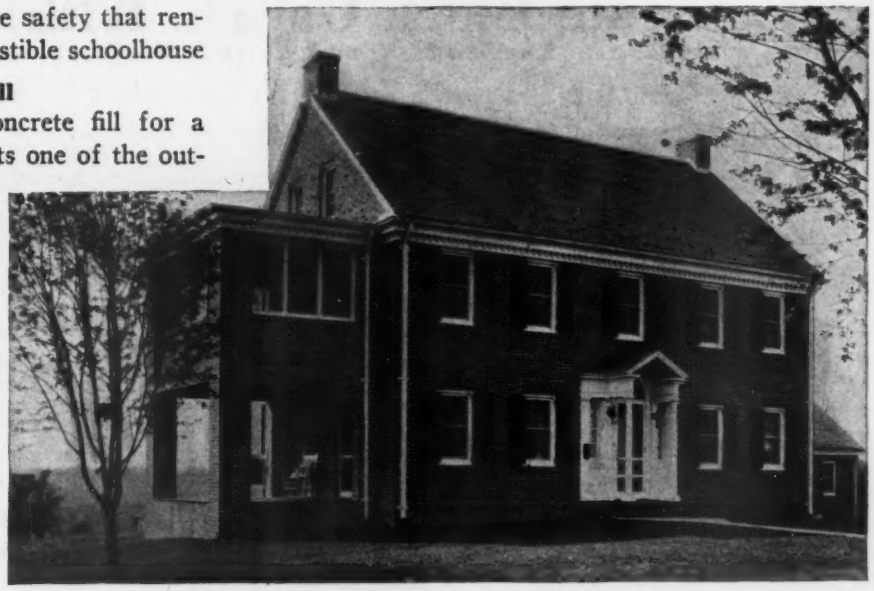


Close-Up View of a Floor Section From the Under Side. This Was Taken in an Ohio High School and Shows the Brick Bearing Walls and Large Structural Beam Supporting the Lighter Steel Joists. The Metal Lath Is in Place for Ceiling Plaster.

is a low cost method of obtaining fire safety that renders the old-fashioned type of combustible schoolhouse obsolete.

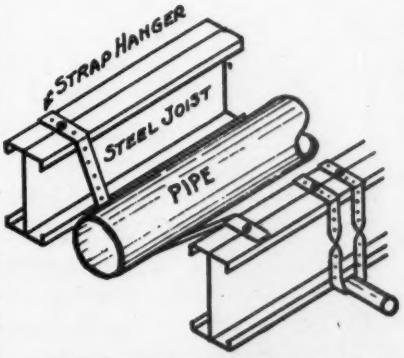
Placing Concrete Fill

The simplicity of placing the concrete fill for a steel lumber fireproof floor represents one of the outstanding advantages of steel lumber construction. No forms of any kind are required. Occasionally, however, contractors handling this type of construction for the first time anticipate difficulty in two operations.



Buchols Residence in Omaha, Neb., Example of Steel Lumber Construction in Residences. The Framework of This Home Is Steel, Joists and Studs.

In the first place, contractors not having wide experience in the use of metal lath have a feeling that the concrete is going to run thru the lath mesh. This comes from their experience with "poured" or thin concrete. For the steel joist fireproof floor a thick mix of concrete is used and can be spread over the lath roughly without any noticeable portion of it going thru. In the second place, the contractor intending to use a wood finish for his floor looks forward to some difficulty in leveling off the concrete fill so that his wood finish will fit evenly on the embedded nailing sleepers. The accompanying cut shows the right way of leveling the fill. The leveling screed may be made sufficiently long to reach across four or five joists and be operated by two men. Sometimes a flat screed is used and the fill then tamped down a little between each joist.



All Pipes Running Directly Under the Floor Should Be Hung in Place Before the Expanded Metal Lath Is Applied to the Tops of the Steel Joists for the Concrete Filler.

Where a wood finish floor is being constructed, the concrete should be about the consistency of the mix used for the base of a concrete sidewalk. In case a concrete, composition, tile, marble or terrazzo finish is to be used, the nailing strips are eliminated and the mixture should be that which is specified for all standard concrete slabs, applied comparatively dry and lightly tamped.

How to Hang Pipes

Where it is possible to do so, all pipes running directly under the floor should be hung in place before the expanded metal lath is applied to the tops of steel joists for the concrete filler. An easy way to support these pipes, following this rule, is to use the metal strap bridging always furnished with steel joists. The bridging can be broken or cut easily and can be nailed to the steel joists by driving nails down into the joist web. A light punch should be used in this operation to start the nail.

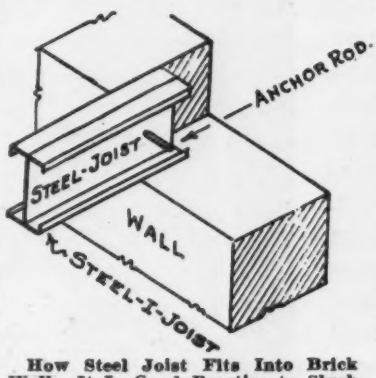
Laying Metal Lath

In laying expanded metal lath on steel joists, end laps must always be directly over joists. End laps should not be less than half an inch. Where rib lath is used, side laps are accomplished by resting one rib over the other. With plain mesh lath, side laps should also be not less than half an inch. Sometimes side laps of plain lath are wired, tho this is not necessary. Lath may be nailed with one-inch large-headed roofing nails driven thru the lath and into the joist web. Nails should be spaced about 8 in. Another practice is to fasten the lath with patented spring clips. The clips are always used for fastening ceiling lath.

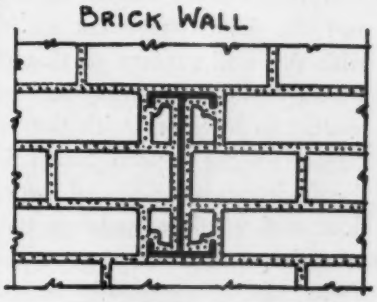
Brick Wall Bearings

When steel joists have bearing on brick walls, as is usually the case in the construction of steel lumber fire-safe first floors for dwellings, they should be bricked in according to the same practice followed in setting wood joists. When laying the brick in between and around end bearing of joists, it is also good practice to slush the mortar around the sides and ends

(Continued to page 103.)



How Steel Joist Fits Into Brick Wall. It Is Good Practice to Slush Mortar Around the Sides and Ends of the Joists.



Brick Wall Bearings in Steel Lumber Construction. This Shows how Brick Fits Around Bearing End.

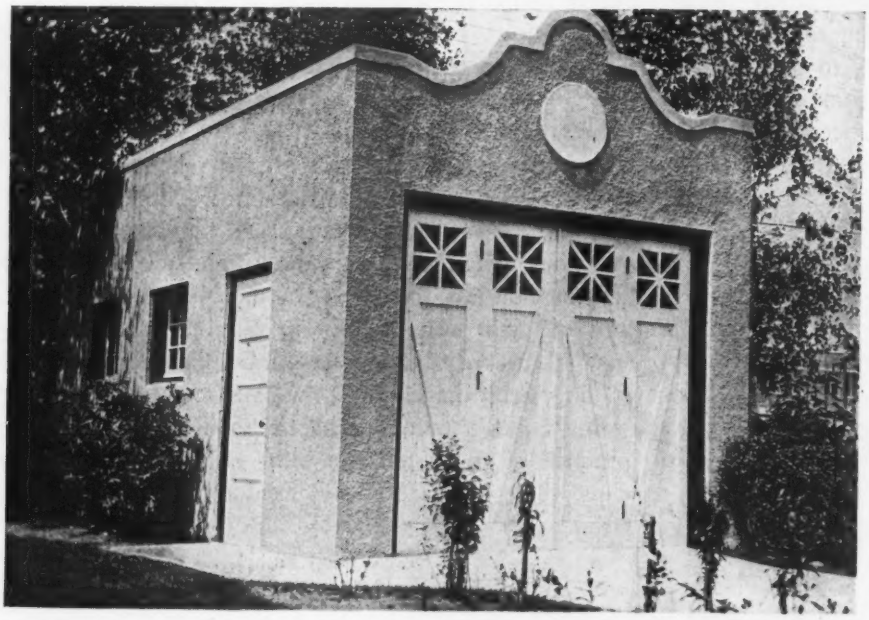
Concrete Block Garage With Stucco Finish

UNUSUALLY ATTRACTIVE BUILDING HAS DISTINCTIVE FACADE AND LARGE EASY MOVING FOLDING DOORS

By W. G. Kaiser

DISTINCTIVE both in design and construction is the garage described in this article. It recently was built for John Ahnfelt at his residence in Chicago. Of concrete block construction with portland cement stucco finish, it is approximately 12 feet wide and 22 feet long. Concrete block used in its construction are the ordinary 8 by 8 by 16-inch units with elliptical air spaces or cells, making a wall 8 inches thick. The block are laid on a monolithic foundation which extends from grade to below possible frost penetration and to solid footing, a depth between 2 feet and 3 feet in this particular case.

View of Ahnfelt Home, Chicago, with Combination Block and Stucco Garage in Rear. The Garage Was Designed to Harmonize with the Residence. Judge the Results for Yourself.

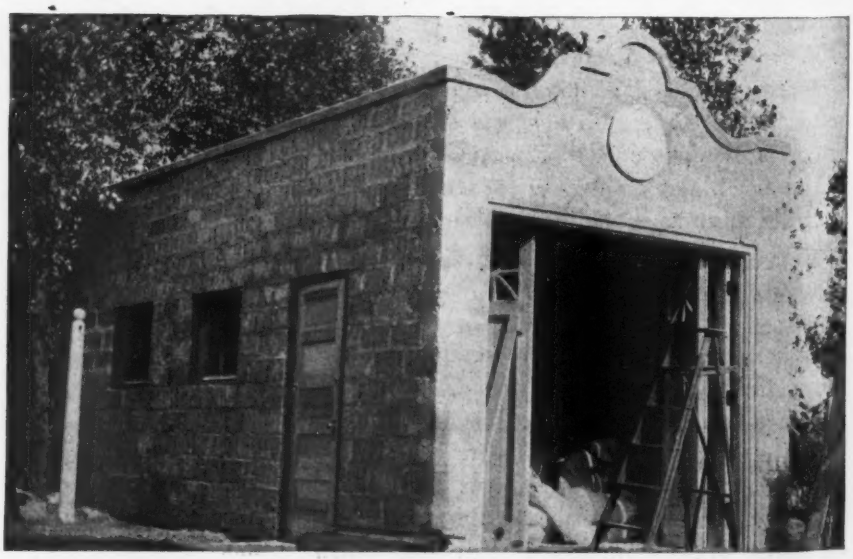


Complete Garage with Stucco Finish Applied. Notice How Well This Structure Blends in with Its Surroundings. The Doors Are the Latest Folding and Sliding Type of Attractive Design.

A rich cement mortar was used and the joints were cut off flush with the wall surface so that there would be no protruding portion of mortar to interfere with the application of the stucco finish later. Angle irons were placed over the door and window openings to sustain the weight of the wall over them. It will generally be found more economical to use reinforced concrete lintels, either cast in place or precast, and then set in place.

The roof is supported on 2 by 10 joists which extend crosswise of the garage at a height of 9 feet above the floor. The roof has a slight slope toward the rear, a fall of 14 inches in 22 feet. The front and side walls of the structure are carried 2 feet above the roof to form a parapet. A neat coping 4 inches thick and 10 inches wide on the top of the wall gives the structure a finished appearance and emphasizes its pleasing lines.

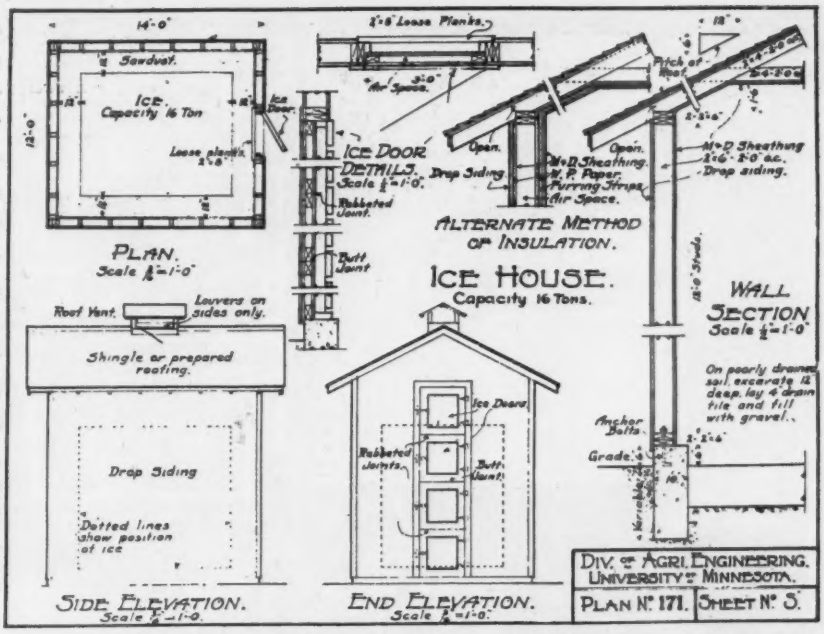
The exterior walls are covered with portland cement stucco which is applied direct to the concrete.



Concrete Block Ready for Stucco Coat. The Roof Is Supported on 2 by 10 Joists Which Extend Crosswise at a Height of 9 Feet Above the Floor. The Stucco Is Applied Direct to These Block,, Which Make a Good Bond Because of Their Rough Texture.

Economical Farm Ice House

AN ice house on the farm can be a very simple structure and, if natural ice is near at hand, the expense for ice during hot weather is very slight compared with the benefits derived. The accompanying plan shows a well constructed building which may be considerably simplified if ice is cheap and the loss by melting is not a serious drawback. Planer chips or sawdust make very satisfactory insulation. It is important that the ice be stored when the weather is cold enough so that the cakes can be frozen together by the addition of water. The ventilation at the ridge or by means of slatted openings at each gable end is very important especially if the sun shines upon the roof. The water from the melting ice should be allowed to seep away thru cinders or gravel or the ice will melt rapidly in warm weather.



Architectural Details of Economical Ice House as Designed by the Department of Agricultural Engineering, University of Minnesota. It Has a Capacity of 16 Tons.

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Steel Lumber Construction

(*Continued from page 101.*)

of joists. It is not necessary to anchor the joists but where this feature is insisted upon a small hole should be punched in the joist web about 2 in. from the end and anchor rod run thru the hole. Cuts show brick around bearing ends and anchoring joists.

General practice thru a long period of years has fixed 13½, 15¾, 19 and 23½ inches as standard spacing for steel joists in fireproof floor construction. When this type of floor is used for apartments, hospitals, schools, dormitories, dwellings, office buildings, etc., a spacing of 23½ inches on center is usually a maximum, while not more than 15¾ inches on centers should be the maximum spacing in floors for garages, factories, warehouses and other structures designed for heavy liveloads. In roof construction spacings up to 47 inches are used.

Elevator Service in the Home

BUILT-IN DUMBWAITERS PROVE TO BE POPULAR LABOR-SAVING DEVICE IN MANY BUILDINGS ESPECIALLY IN FARM HOMES—SEE DETAILS ON PAGE 105

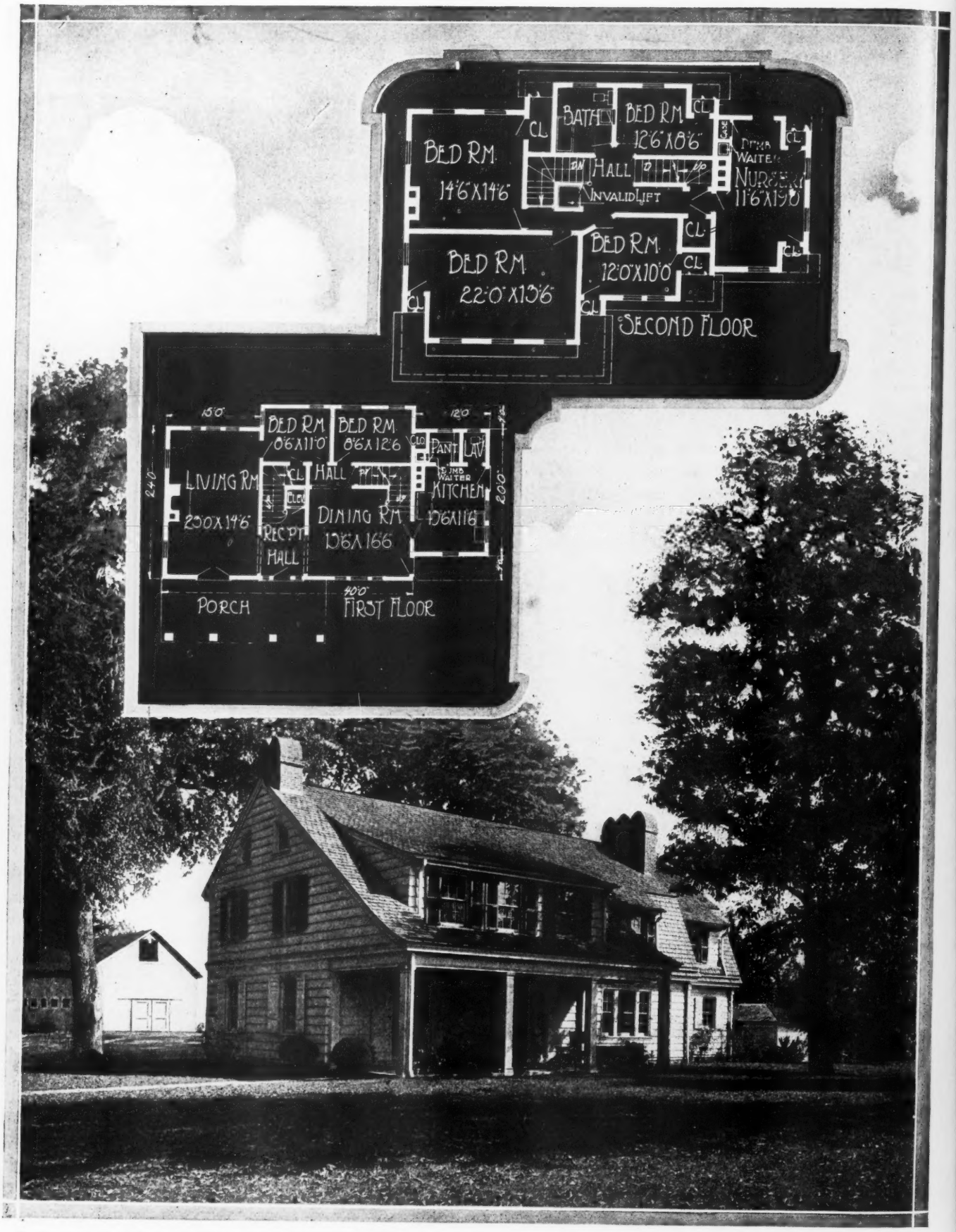
BUILT-IN service with a subsequent saving of space is one of the specialties of the modern builder. Many builders have found dumbwaiters a very good means for increasing the satisfaction of their clients; this is especially true in farm homes where the home is larger because the family is larger and the duties of the housewife many. The dumbwaiter solves many of her problems in the matter of carrying foodstuffs and other necessities from the cellar to the kitchen and rooms upstairs.

As shown in the full page detail blueprint sheet on page 105, the dumbwaiter is usually installed in a corner of the wall which ordinarily would be waste space. Starting down in the cellar in the fruit or vegetable storage room, it leads up to the pantry or kitchen above where the foodstuffs are prepared. In many homes one room is set aside for a nursery for the children; in case of illness the dumbwaiter is immediately available, and meals and other supplies can be sent up from the kitchen without extra trouble for the housewife.

While the use of dumbwaiters is extensive in farm homes because of the conditions prevailing there, it is by no means confined to this field. Residences in cities and particularly large apartment buildings are equipped with dumbwaiters to serve in many ways. In apartment buildings the delivery man places his goods on the dumbwaiter in the court below and conveys them by means of this device to the floor he wants. There the housewife can get her goods without climbing up and down several flights of stairs.

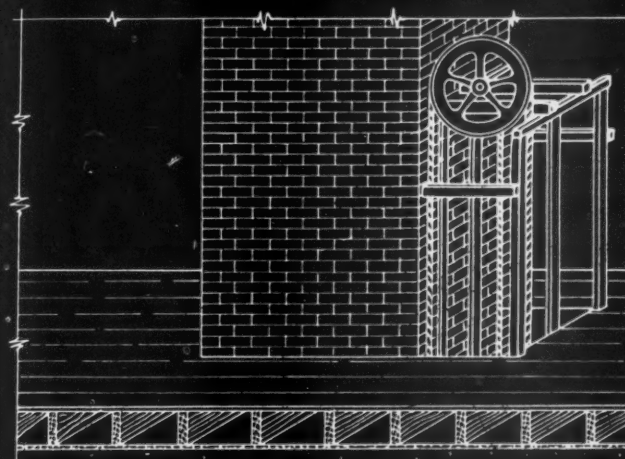
These built-in elevators, as they are often called, are made in a great variety of designs. Some are operated by hand, others by power of some kind. Some extend only from the kitchen to the cellar below. When in position they are lowered into the cellar and covered by a door which is set in the kitchen floor. The press-button brings the dumbwaiter thru into the kitchen.

There are two general types—the plain and geared. In the home, for average work where the usual load is less than 25 pounds, the automatic brake waiter is used. The load cannot run down but is held by the machine automatically. In factories, hospitals, and apartments, a band brake is used. For heavier work the geared type of machine is recommended.

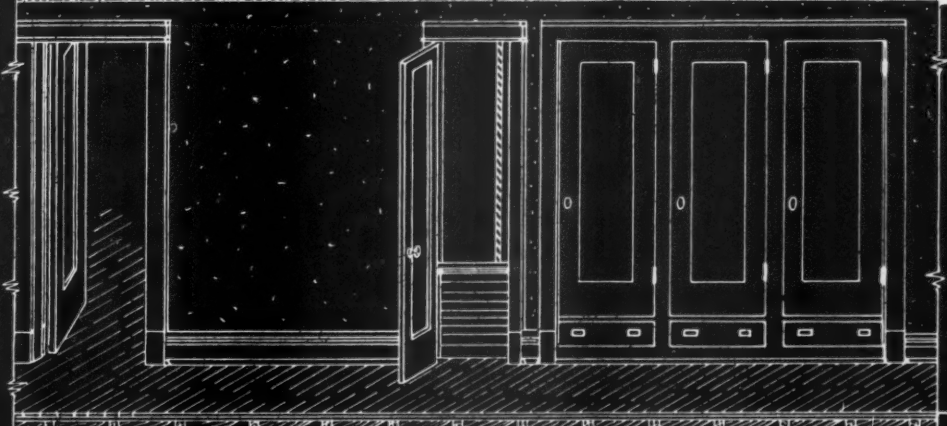


COMFORTABLE FARM HOME OF DISTINCTIVE LINES. This attractive Colonial house has a rambling appearance that indicates comfort, and simplicity. It fits snugly and harmoniously into the surroundings. Set on a level with the ground, it has a long porch recessed under the main roof and covered with a brick floor. Ten rooms have been provided in the floor plans, as it is designed for the needs of the large farm family. On the first floor is a very commodious living room, Colonial style, dining room, kitchen and two bedrooms, very convenient for the men who have to rise early. On the second floor are four bedrooms and a large nursery, a very desirable feature for children. An invalid elevator and dumbwaiter are some of the built-in conveniences of this modern farm home. Details of dumbwaiter are shown on the opposite page. Size of house, 40 by 24 feet.

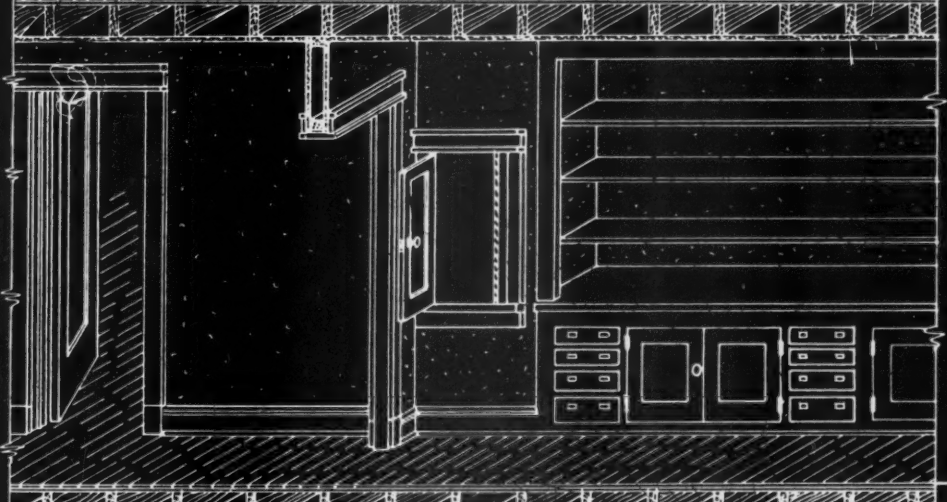
RECOMMENDED CONSTRUCTION



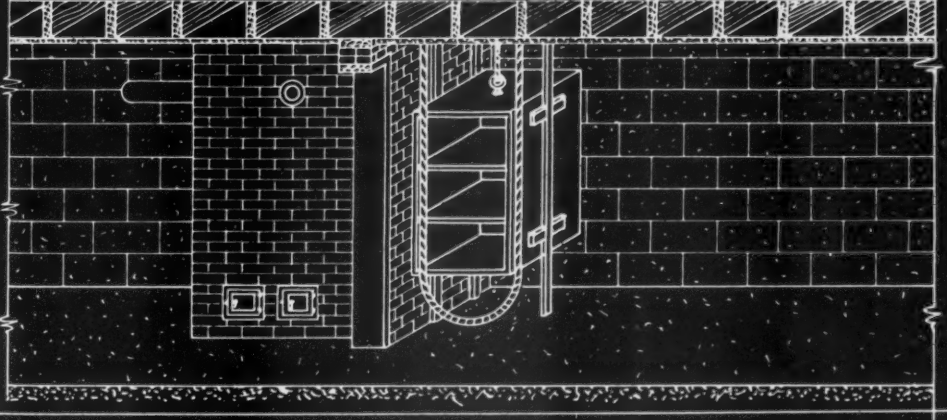
ATTIC
SHOWING THE
DUMB WAITER
CONNECTING
WITH STORAGE
ATTIC.



SECOND FLOOR
SHOWING THE
DUMB WAITER
OPENING INTO
NURSERY OR
SICK ROOM.



FIRST FLOOR
SHOWING THE
CONVENIENCE
OF DUMB WAITER
OPENING INTO
PANTRY NEXT
TO KITCHEN.



BASEMENT
SHOWING THE
ADVANTAGE
OF DUMB WAITER
CONNECTING
WITH COOLER
OR FRUIT CELLAR.

ELEVATION OF DUMB WAITER

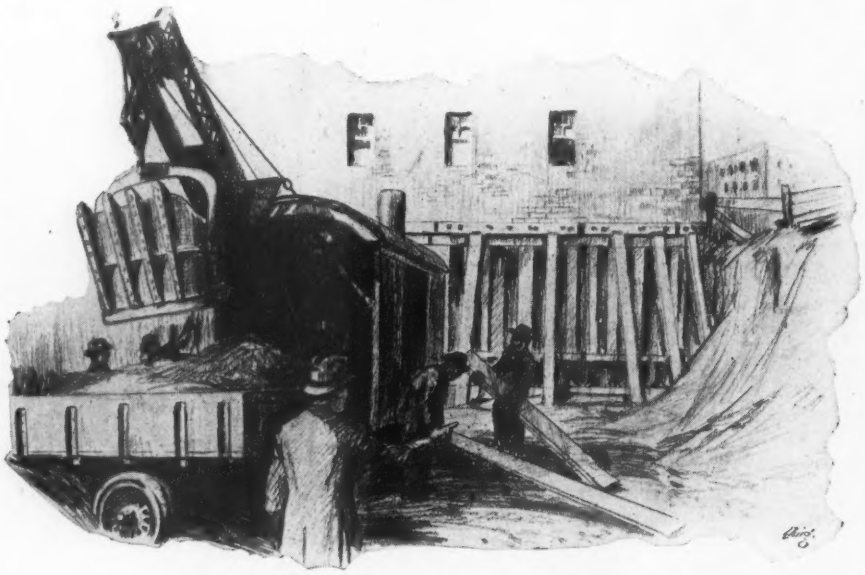
Law for the Builder

JUDICIAL CONSTRUCTION OF BUILDING CONTRACTS INRESPECT TO DUTY OF CONTRACTOR IN PROTECTING ADJOINING BUILDINGS FROM DAMAGE

By Leslie Childs

THE duty of a building contractor with respect to preserving the property, adjoining that which he is working upon, from injury or damage is one difficult to define in a specific way. This is so because this duty depends in so many cases not only upon the terms of the contract, that he has entered into, but it may also be affected by local statutes, ordinances, and building regulations.

For the above reasons the subject is a difficult one to treat specifically, and the statement of any general rule that would apply in all states, and situations, is hardly possible. However, the point is one of vital interest and importance, especially to the building contractor operating in any large city, and the examination of a case on the point can hardly fail to be of some value; this for the reason that its holding will point the way, and give a general idea of the reasoning followed by the courts in interpreting building contracts, in respect to this feature.



During the Work of Excavation It Became Necessary to Underpin the Adjacent Building. The Contractors Put in a Bill for This Work.

Of the cases of this class reported in the books, Alta Planing Mill Co. vs. Garland, a California case reported in 138 Pac. 738 is of special interest. The facts in this case were many and involved, but greatly abbreviated they were, insofar as material to this discussion, as follows:

Contract To Construct Building Entered Into

The Alta Planing Mill Company entered into a contract with Garland in which it agreed to construct a certain building in the City of Los Angeles. The contract contained, among other specifications, one of the following effect:

That the contractor would do everything necessary to protect adjoining buildings, streets, etc., during the excavation; "doing all shoring and bracing, and trenching required to this end." The contract contained other clauses relative to the responsibility of the contractor which will be touched on later.

The Alta Company, the contractors, started work upon the excavation and it became apparent that it would be necessary to underpin a certain adjoining building, the property of the Mercantile Improvement Association. It appears that Garland, the owner, thru his architect, notified the representative of the Mercantile Improvement Association about the matter, and that they negotiated, to some extent, relative to who should bear the expense.

Nevertheless, Garland's architect afterwards ordered the contractors, Alta Company, to underpin a certain side of the Mercantile place building. And in compliance with this order the Alta Company completed the underpinning, at a cost of $2,274.77. Thereafter the Alta Company presented their bill for this extra work, payment was refused, and they brought an action against Garland for the amount.

Upon the trial of the cause Garland, the defendant, defended upon the grounds, among other things, that the work done in underpinning the adjoining building was included in the specification of the contract quoted above. The trial, however, resulted in a judgment in favor of the Alta Company, the contractors, from which the other prosecuted an appeal to the Supreme Court. In passing upon the record, and the various contention of the defendant, the Supreme Court, among other things, said:

Underpinning of Adjoining Building Not Part of Contract

"Appellant's [Garland] first contention is that the work for which the suit was brought was a part of that which plaintiff [Alta Planing Mill Company] was required to do under his contract. The contract contains, among other specifications, the following: 'The contractor shall do all that is necessary to protect the adjoining buildings, streets and the public during the excavation, doing all shoring and bracing and trenching required to this end.' This did not place upon the contractor the duty of going upon the adjacent property and putting supports beneath the foundations of the building thereon. * * *

"Nor was the contractor liable under a clause requiring him to assume all responsibility for damages which might occur to the building or to any adjoining

building by any act or omission of himself or his employes. It is the usual paragraph in such agreements protecting the owner from the results of carelessness in the prosecution of the work.

"Appellant was not protected by that part of the building contract requiring the contractor to furnish any necessary thing which might have been omitted from the specifications, nor by that by which the contractor was to furnish all requisite materials for the contract price. These obviously did not include work done on another man's property which was not a part of the scheme of construction. * * *

"The work for which this suit was instituted having been ordered by the authorized agent [architect] of the appellant, there arose an implied promise to pay the reasonable value thereof. * * *"

The court thereupon, after disposing of other points too numerous to outline in a brief article of this kind, concluded by affirming the judgment rendered in favor of the contractor in the lower court. Holding in effect that in this case the underpinning done was outside the contract for the construction of the building, not in contemplation of the parties, when the terms of the contract were entered into, and should be paid for as extra.

As noted heretofore, the statement of a general rule, outlining the duty of a contractor in respect to the protecting of adjoining property would be difficult, if not impossible, to formulate. For the determination of each dispute of this kind must necessarily depend upon the particular facts and circumstances involved.

Nevertheless, the California case reviewed above is a strong, well considered case on the point involved, and is of great value in illustrating the general interpretation placed upon building contracts relative to the duty of the contractor in respect to protecting adjoining property, illustrating in a fair manner the construction usually placed upon ordinary contracts of this kind in limiting their terms to the work that was contemplated by the parties when the agreement was entered into.

Sidewalk Light Construction Increases Floor Space

SMALL GLASS LENSES SET IN STEEL AND CONCRETE FORMS FOR SIDEWALKS, ROOFS, ETC.—DETAILS ON PAGE 109

THE high cost of land in business districts puts an extra premium on space. Consequently when the builder draws up his plans for a structure he must give this factor careful attention. Another feature, just as important, is lighting facilities. While artificial light will serve, effort is made to provide as much natural light as possible. Builders have been able to accomplish satisfactory results in both these cases with the aid of special sidewalk, vault, and roof lights.

Briefly, this material consists of heavy pieces of transparent glass set into steel forms and imbedded firmly with concrete. Sections can be used in sidewalks, roofs or over vaults. Because of its strong construction this material will carry a heavy load without breaking, and at the same time admit light thru the small glass lenses. Placed in sidewalks, it opens up the space underneath for use as extra sales rooms, etc. Thousands of square feet of floor space have been added to stores and other buildings by this construction.

In a similar way the lights are used in factory, store and vault roofs.

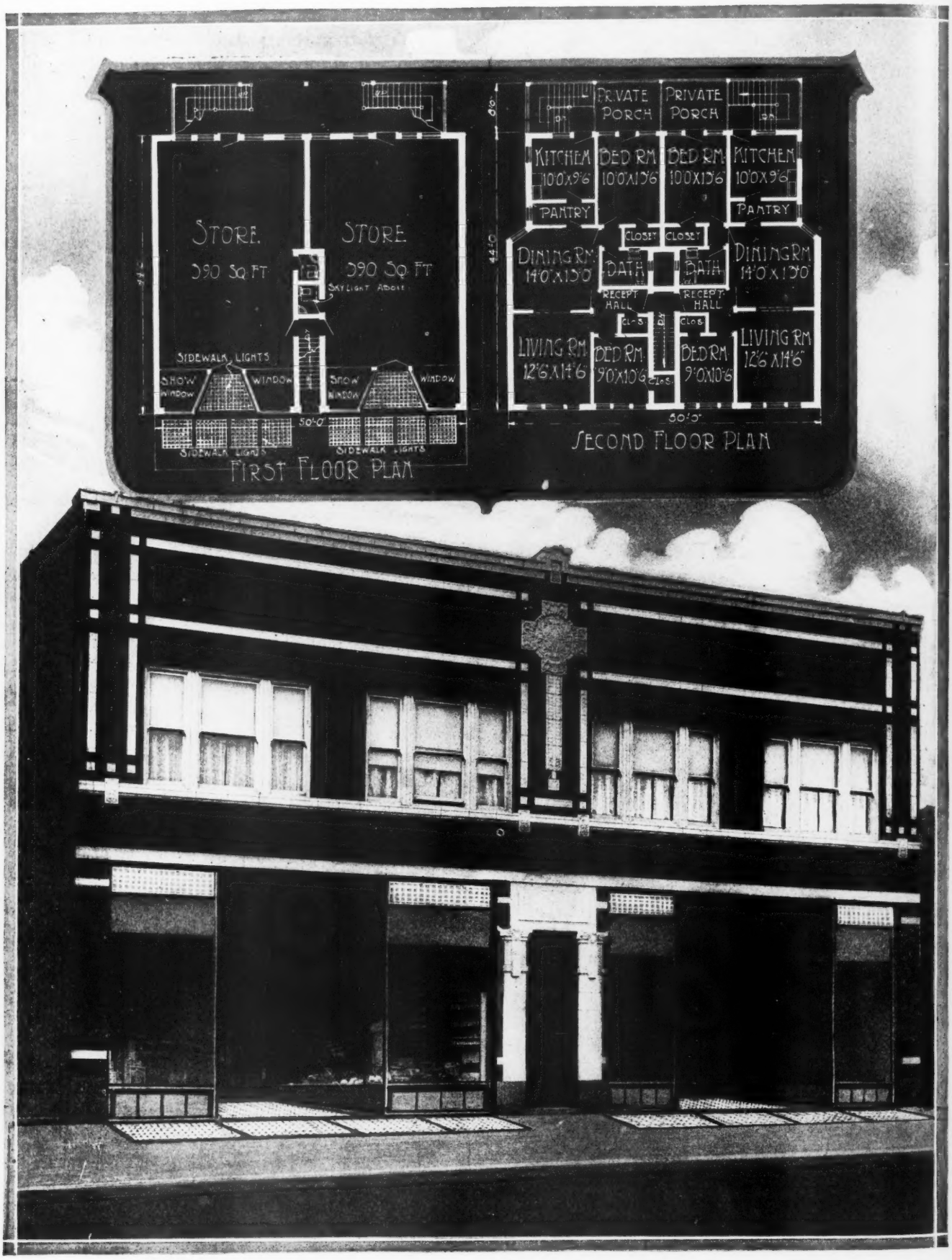
In laying sidewalk lights, the steel forms are laid across the girders which extend from the building out to the curbing as shown on the detail sheet on page 109. The longer the span, the more light is admitted to the space below. This arrangement is waterproof and provides a maximum amount of glass area. The glass lenses are made of heavy glass and can be replaced very easily. They are designed differently for various uses. The galvanized forms are laid directly on the bearings and the glass then inserted into spaces provided in the steel forms. Reinforcing rods are then laid and the concrete poured into place. The forms, reinforcing rods and glass are thereby permanently joined together.

Ample provision for expansion and contraction should be made. This is done by allowing not more than 30 square feet in one panel. Less area is even more desirable. Regardless of bearings if the edges of the slab are not clear or come in contact with some other construction, a joint of not more than ½ inch or less than ¼ inch should be provided and filled with expansion compound. These joints provide opportunity for action of the construction caused by contraction and expansion and are necessary to prevent cracking of glass.

Tables of safe loads for this construction and other specifications are furnished by the various manufacturers.

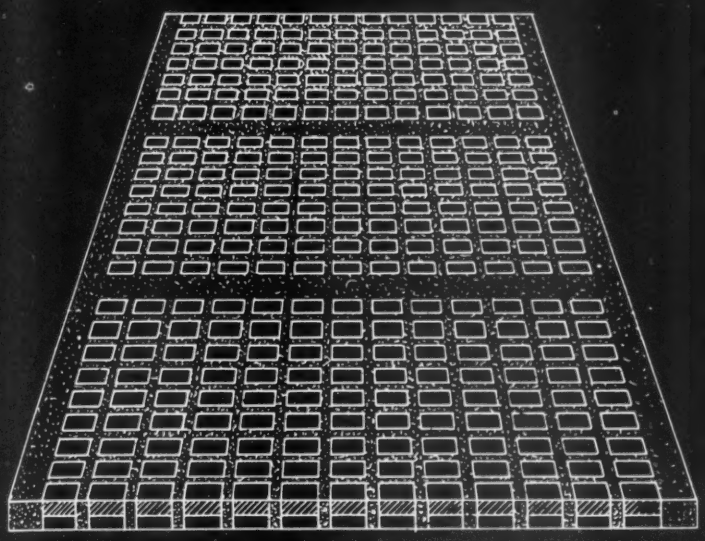
Many accessories are fitted with this glass to provide light; for instance, sidewalk doors, coal-hole tops, etc. The glass lenses are made in many shapes, the most popular being the square and round styles.

ARCHITECTS—What labor saving plan did you use on your biggest job? What system of estimating have you found the most efficient? Pass along some of your tried and successful ideas to other architects and contractors. Write that story today and send it to us. What building is your favorite and why? Send the floor plans and pictures to the editors of the AMERICAN BUILDER.

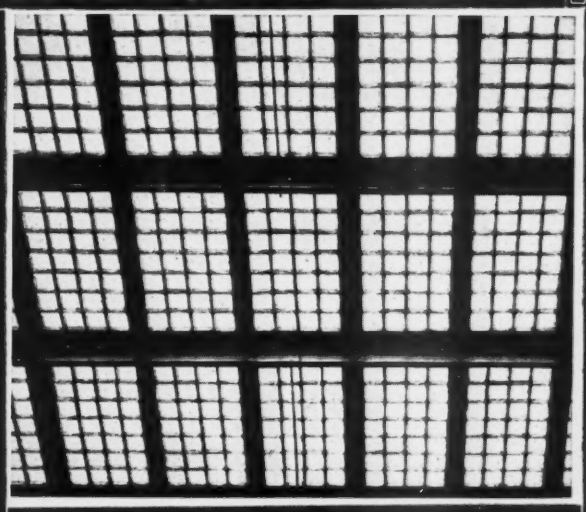


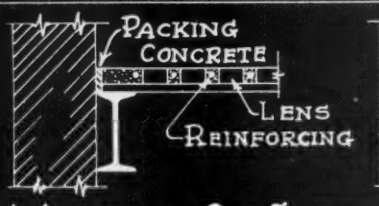
MODERN DOUBLE-LOT STORE BUILDING. A good example of small business structure built on two lots with apartments on the second floor. This building has an attractive brick facade with terra cotta trim and two store fronts of standard construction, allowing splendid show window space. The basement extends out under the front sidewalk and is lighted in part by sidewalk lights, details of which are shown on the opposite page. Each store contains 390 square feet of floor space and gets extra light from skylights located in the center of the building. On the upper floor are two apartments of five rooms each—two bedrooms, living room, dining room, and kitchen. The sidewalls are drawn in at the rear to provide extra light for the apartments. This building is 50 feet wide and 44 feet long.

RECOMMENDED CONSTRUCTION

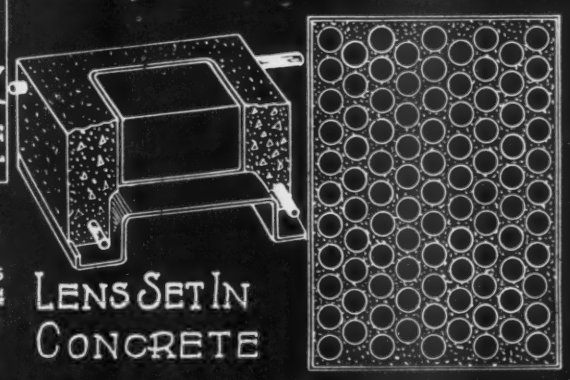


ELEV. OF SQUARE LENS SIDEWALK LIGHTS SET IN REINFORCED CONCRETE



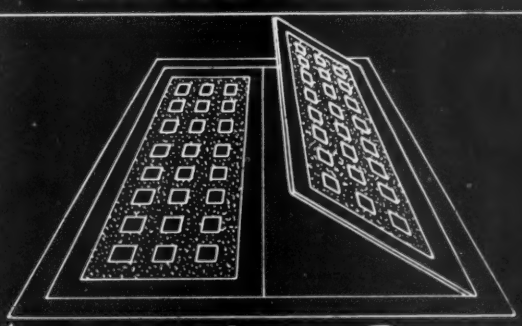


METHOD OF SUPPORTING SIDEWALK LIGHTS AT WALL OF BUILDING

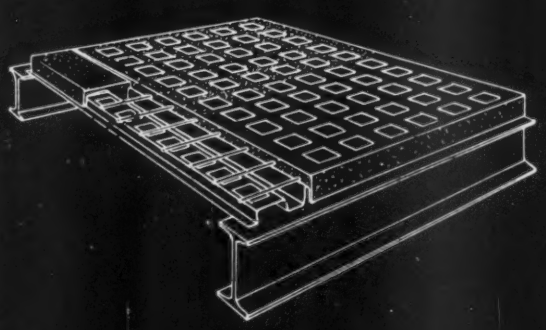


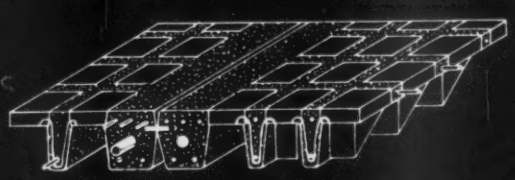
LENS SET IN CONCRETE

ROUND LENS SIDEWALK LIGHTS

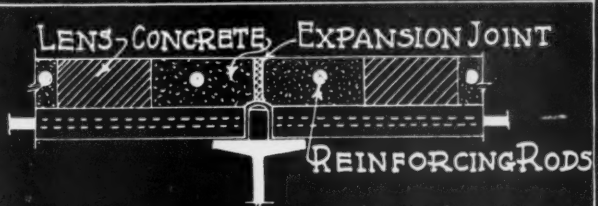


SIDEWALK DOORS PROVIDED WITH GLASS



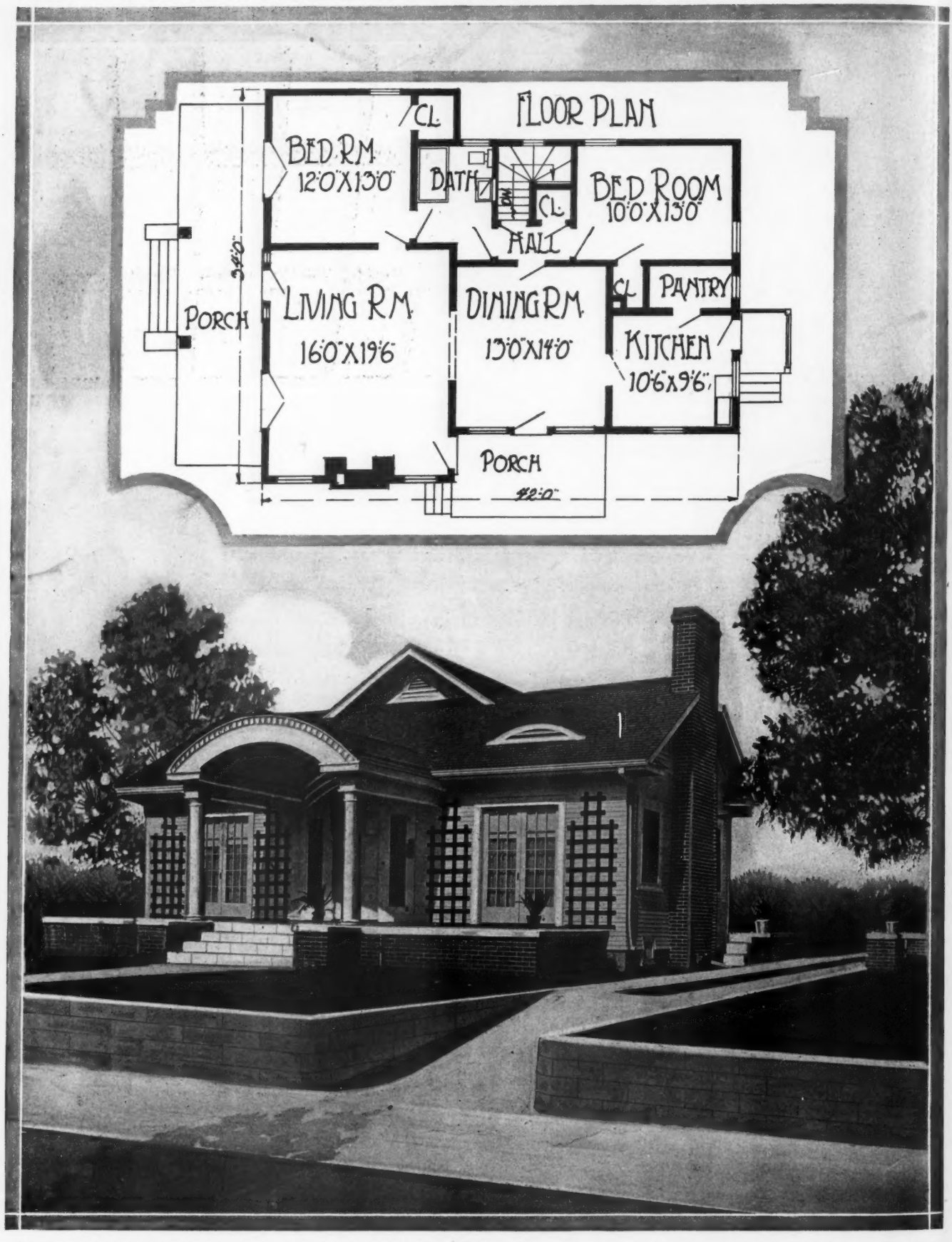


DIFFERENT METHODS OF CONSTRUCTING SIDEWALK LIGHTS



CROSS SECTION SHOWING EXPANSION JOINT

SIDEWALK LIGHT SYSTEMS



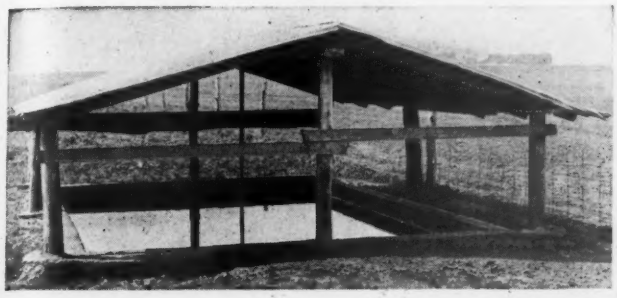
ATTRACTIVE BUNGALOW OF PLEASING DESIGN. One of the many charming patterns that have come out of the progressive West, where bungalows are beautiful and plentiful. The frame exterior is particularly attractive because of the many unusual touches. A broad terrace supported by brick walls extends across the front of this home; an arched portico covers the approach to the door, which is modeled somewhat after the popular Colonial entrance. Double French doors open from the terrace on either side of the door into the living room and dining room. There are five rooms in all; two bedrooms and kitchen in addition to the two just mentioned. The living room is large and spacious with open fireplace. The dining room adjoins it; the bedrooms are on the opposite side of the house. A small kitchen completes the plan. Size, 34 by 42 feet.

Concrete Hog Wallow

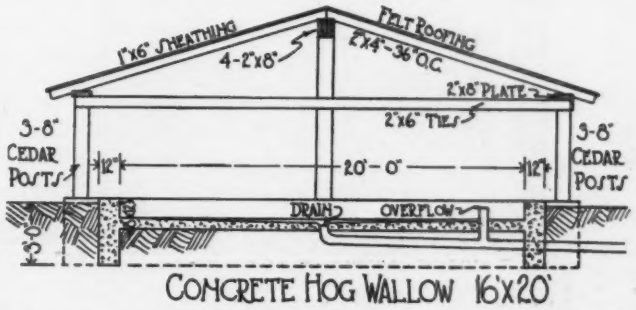
ONE OF HANDY BUILDINGS AROUND FARM THAT CONTRACTOR CAN BUILD IN SPARE TIME—GREAT AID TO ANIMALS IN WARM WEATHER

THERE are a great many small structures about a farm that are simple in construction but important. It is up to the rural builder, especially the mason contractor, to call these matters to the attention of the farmer. For instance, the hog wallow is a small structure that is important in keeping the hogs comfortable during the excessively hot weather. Farms with hogs should have one of these. They can be erected in spare time by the builder and will not cost much because the roof and supports can be made from old and used timbers. Some good felt roofing over 1 by 6 inch sheathing will be excellent covering.

The trough of concrete is the big part of the job and is made like the cross section shown here. In the center of the floor is a drain with a pipe leading to the disposal field. The concrete wall is built around this trough to keep the water from overflowing. A few 3 by 8 inch posts are enough to support the roof while 2 by 6 inch lumber will serve for cross ties and plates. This wallow is 20 feet wide.



Concrete Hog Wallow—the Hog's Oasis in the Warm Sultry Summer Days. It Can Be Constructed at Little Expense by the Builder.



Cross-Section of Concrete Hog Wallow with Shelter. Note the Sizes of Timber and Posts That Can Be Used, Also Contour of Wallow Floor.

Wood Block Floors in Factory Buildings

SPECIAL CREOSOTED BLOCKS OF VARIOUS SHAPES USED EXTENSIVELY IN FACTORY STRUCTURES BECAUSE OF RESISTANCE TO VIBRATION AND EASE UNDER FOOT—DETAILS ON PAGE 113.

WOOD block floors are now used extensively in factories, machine shops, garages and stables because of their resistance to vibration, ability to carry heavy loads, and ease under foot. They are manufactured in various designs to meet special conditions. Some are rectangular in shape, 3 to 5 inches in width or 2 to 4 inches in depth, depending on the particular needs of the building. These blocks are made of Southern pine and treated with creosote to insure lasting quality and resistance to decay.

While various manufacturers have special grooves and lugs in their blocks, the system of laying is practically uniform and completely covered in specifications issued by each concern. Details of this construction are shown on page 113.

These blocks are laid over a concrete base as a rule altho other material is very often used. The concrete is recommended whenever practicable. The minimum thickness of the base should be about 4 inches and should increase in thickness in proportion to the load which the floor is designed to carry. A very good mixture for this concrete is one part portland cement, three parts sand, and six parts stone. The top of the concrete should be smoothly finished.

After the concrete is thoroly dried it is coated with a thin layer of bituminous cement which is allowed to harden before the blocks are laid. This coating forms a sort of cushion for the block above and helps to give the resilient effect which block floors possess. In case the concrete has not been finished smooth, it is brought to an even surface by dry cement mortar which is well sprinkled with water before the blocks are laid.

The blocks are laid tightly together with grain vertical directly upon the base, their length at right angles to the line of traffic, care being taken to break joints about 2 inches. When dry cement has been used underneath, the blocks should be tamped until they are brought to a smooth surface.

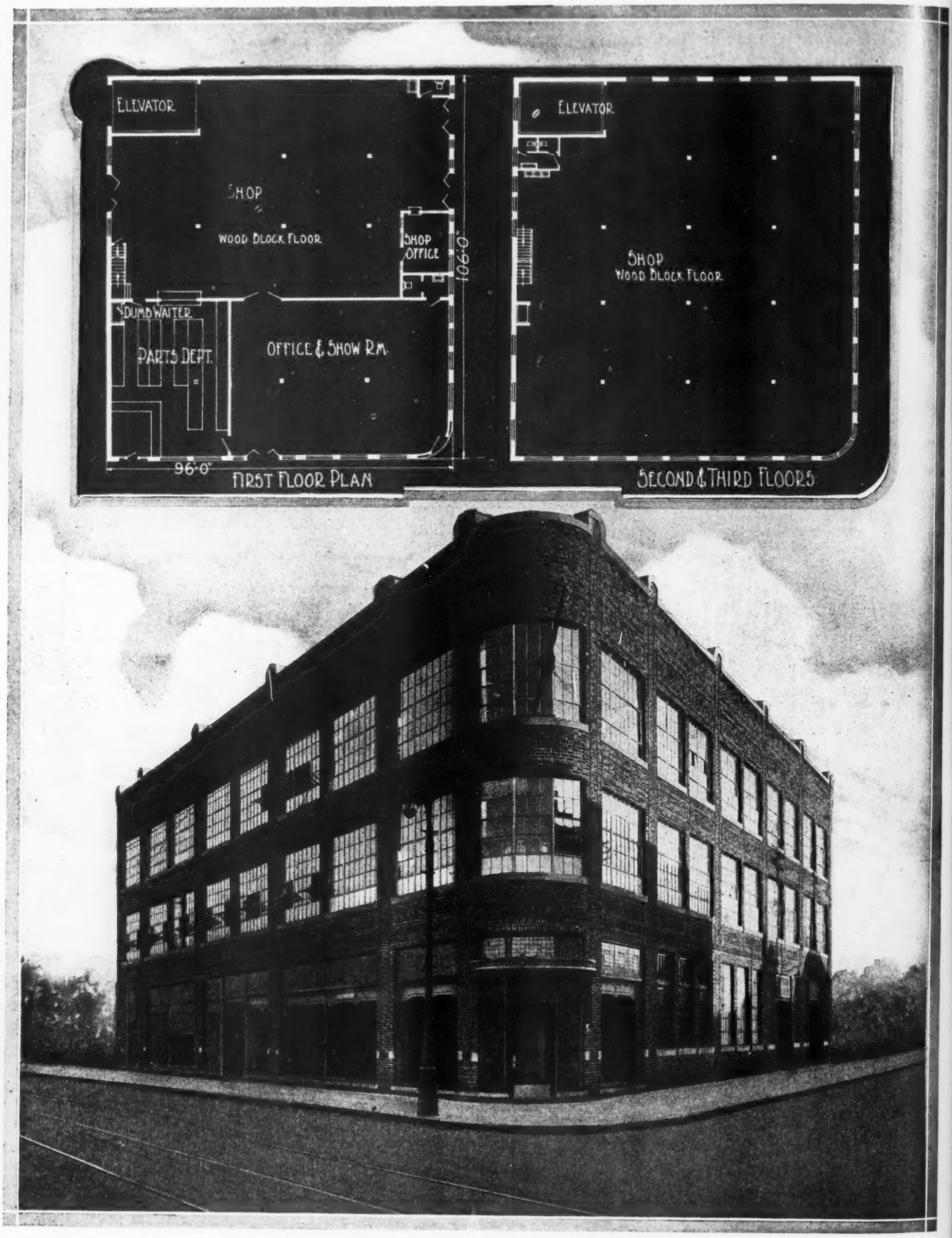
After each four layers have been laid the blocks should be tightened by applying a two by four or other piece of lumber against the outside edge. Very often in floors subject to a great deal of moisture, blocks with special locking lugs are used.

After the blocks have been laid in place and brought to as level a surface as possible, the joints between the blocks are filled with a special bituminous filler applied hot. This filler is generally applied by flushing over the surface with a squeegee to force it into the joints. Care must be taken to see that the filler penetrates the full depth of the joints. Then dry sand is swept over the floor completely covering the blocks, and is left there until the blocks are well set.

✣

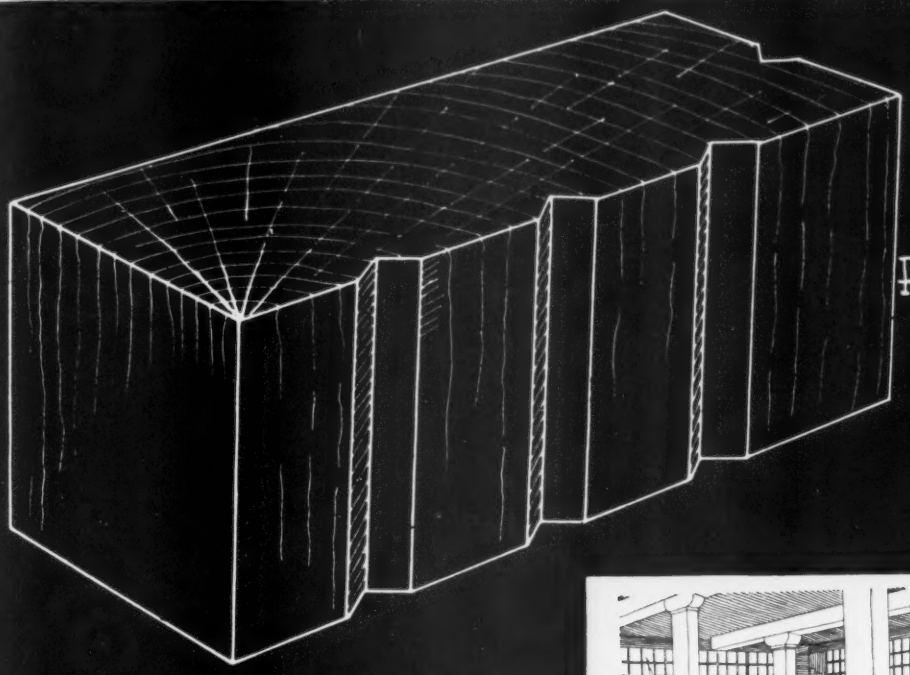
EVERY builder who is a good builder takes pride in the building he erects. And the AMERICAN BUILDER takes a satisfaction in reproducing photographs of such buildings, for the reason they pass good building ideas along. When you have finished a building of which you are proud, send in a photograph of it and a pencil sketch of the floor plans.

Auto Service Station with Wood Block Flooring Details

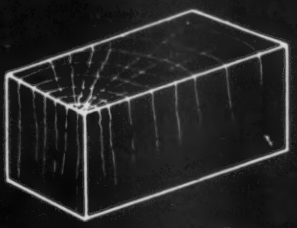


AUTOMOBILE SERVICE STATION AND SALES BUILDING. An essential structure in small and large cities because of the large number of automobile owners. This building has been built along the most modern lines with daylight steel sash in the upper floors and wood block flooring (See details on opposite page). Both of these features are essential because of the character of the work carried on in the building. Built of steel and brick, this building forms an attractive corner as well as a fireproof structure. On the first floor are the office, sales rooms, parts department, and emergency workshop. The two upper floors are shops. A freight elevator in the rear takes care of heavy lifting while a small dumbwaiter carries lighter parts to the shops above. The building is 96 by 106 feet.

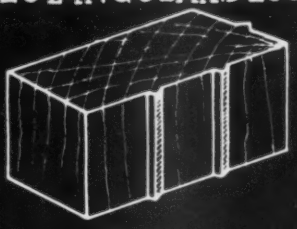
RECOMMENDED CONSTRUCTION



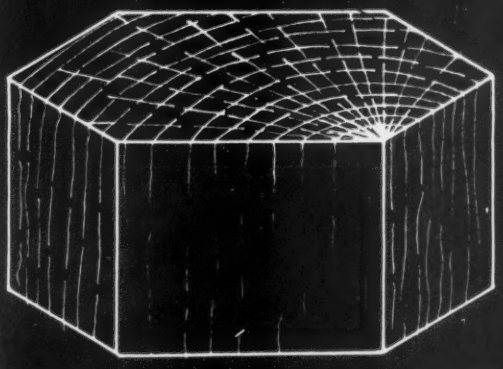
GROOVED BLOCK



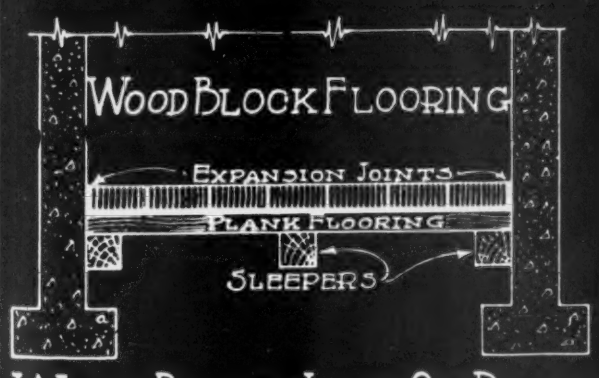
RECTANGULAR BLOCK



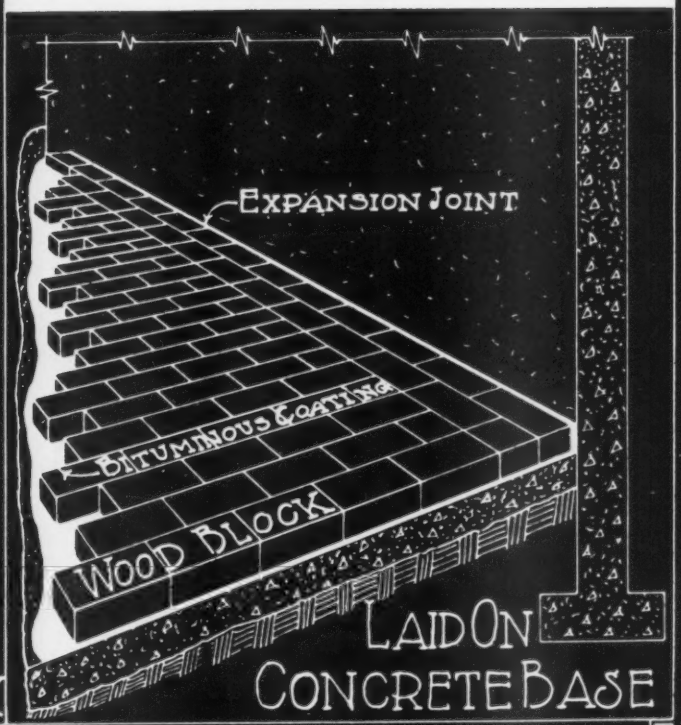
LUG BLOCK



HEX BLOCK



WOOD BLOCK LAID ON PLANK



LAID ON CONCRETE BASE

WOOD BLOCK FLOORING

DESIGN of SAFE CONSTRUCTION

By Charles W. Leigh,
Associate Professor of Mechanics, Armour Institute of Technology

Figuring Loads on Long Columns

ARTICLE 13 OF AN EXTENSIVE SERIES ON STRENGTH OF MATERIALS

A LONG column is a piece of timber or iron having its length in inches, at least ten times the least dimension of its cross-section. Fig. 1 shows such a column under a load in common constructions. The least dimension shown is 6 inches, while the length is 6 feet, or 72 inches. Since 72 inches is twelve times 6 inches, the column is classified as a long column, and must be figured as such.

Fig. 2 shows the types of long columns. A pin connected column is not so strong as the other types because of the ease with which the ends may turn about the pins. They are used more experimentally, in determining the theory of columns.

Columns with both ends fixed are the ones used in common practice, because of the ease in fastening or fixing them, and also because they are stronger than the other types. A flat end column must have the ends squared up so that the timber is at right angles to the surface against which it bears. This means that the column would bear equally over all parts of its ends against the resisting surface. Also, that the load would bear equally over the top of the column, and its resultant would act straight down thru the center of the column. The column should be straight and free from loose knots or blemishes.

The ends of a flat column must either be braced to prevent tipping or side motion, or be riveted to the structure if made of steel. In practice flat or fixed ends are figured as equally strong.

There are many column formulas in use which give safe results, under certain specified conditions. But the one to be presented in this article is called Johnson's parabolic column formula. It is useful in designing timber columns where the length in inches divided by the least dimension of its cross-section is not greater than sixty. The ends are perfectly squared, fixed in place, and the load centrally applied.

A separate formula is given for each kind of wood used. They are as follows:

For Georgia yellow pine columns:

$$\frac{W}{A} = 4{,}000 - \left(\frac{8}{10} \times \frac{l}{d} \times \frac{l}{d}\right) \quad \text{.....I}$$

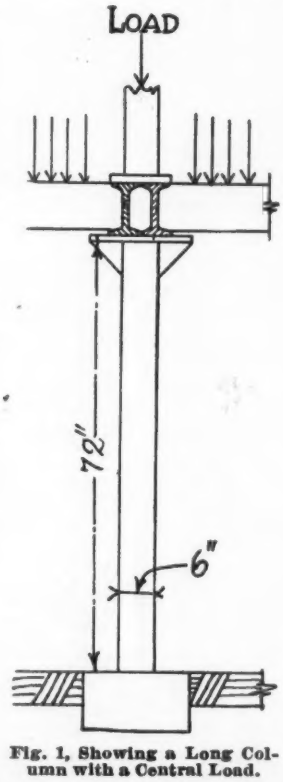


Fig. 1, Showing a Long Column with a Central Load.

For short leaf yellow pine columns:

$$\frac{W}{A} = 3{,}300 - \left(\frac{7}{10} \times \frac{l}{d} \times \frac{l}{d}\right) \quad \text{.....II}$$

For white oak columns:

$$\frac{W}{A} = 3{,}500 - \left(\frac{8}{10} \times \frac{l}{d} \times \frac{l}{d}\right) \quad \text{.....III}$$

For white pine and spruce columns:

$$\frac{W}{A} = 2{,}500 - \left(\frac{6}{10} \times \frac{l}{d} \times \frac{l}{d}\right) \quad \text{.....IV}$$

In each of the four formulas, W is the breaking load, A is the area in square inches of the cross-section of the column, l is the length in inches, and d the least dimension of the cross-section of the column in inches.

In all designing, the thing desired is the safe load the column will carry. Since the four formulas give the breaking loads, the safe load is found by dividing the breaking load W by a factor of safety, say from 5 to 10, depending on the character of the loading.

In order that these formulas may be better understood, some applications will now be made.

Suppose a 6 by 8-inch Georgia yellow pine column 12 feet long is used. To find what load it will carry safely with a factor of safety of 5. Here the length is $12 \times 12 = 144$. The least dimension is 6 inches. Also $144 \div 6 = 24$. We may then use Formula I, since this quotient is less than 60.

$l = 12 \times 12 = 144$ inches, $A = 6 \times 8 = 48$ square inches, and $d = 6$ inches. Substituting in I,

$$\frac{W}{48} = 4{,}000 - \left(\frac{8}{10} \times \frac{144}{6} \times \frac{144}{6}\right)$$

$$\frac{W}{48} = 4{,}000 - .8 \times 24 \times 24 =$$

$$4{,}000 - 461 = 3{,}539$$

$W = 48 \times 3{,}539 = 169{,}870$ pounds (breaking load). Since the factor of safety is 5 the safe load is:

$$\frac{W}{5} = \frac{169{,}870}{5} = 34{,}000, \text{ approximately}$$

Suppose the problem is to find the proper size of a square white pine column 15 feet long to safely carry 40,000 pounds with a factor of safety of 8. Then W would equal $40{,}000 \times 8 = 320{,}000$,

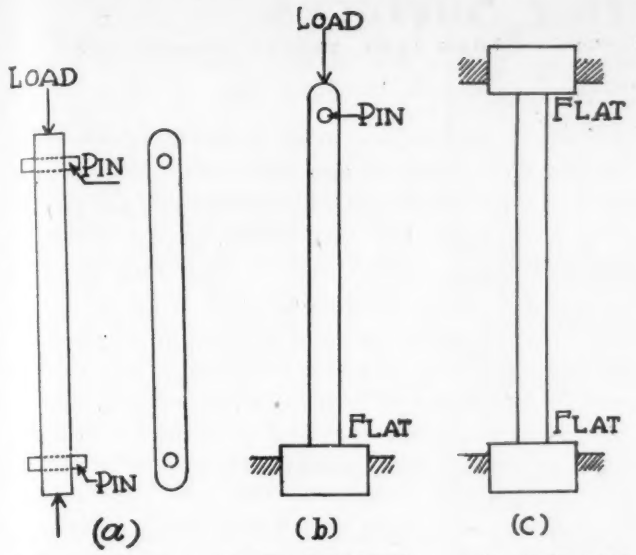


Fig. 2. (a) Pin Connected. (b) One End Pinned and the Other Flat (c) Both Ends Fixed.

$l = 15 \times 12 = 180$ inches, and $A = d \times d = d^2$.

Substituting in Formula IV:

$$\frac{320{,}000}{d^2} = 2{,}500 - \left(\frac{6}{10} \times \frac{180}{d} \times \frac{180}{d}\right) = 2{,}500 - \frac{19{,}440}{d^2}$$

By transposing the second term of the right-hand number, and changing its sign we have:

$$\frac{320{,}000}{d^2} + \frac{19{,}440}{d^2} = 2{,}500$$

Since both terms are above d^2, they may be added and

$$\frac{339{,}440}{d^2} = 2{,}500$$

Dividing both sides by 10 and multiplying thru by d^2 we have

$$250\,d^2 = 33{,}944$$

$$d^2 = \frac{33{,}944}{250} = 136, \text{ approximately}$$

The problem now is to find a value of d which multiplied by itself will give 136. Now, $11 \times 11 = 121$ and $12 \times 12 = 144$. It is seen from these results that a 12 by 12 must be used as an 11 by 11 would be too small, or $d = 12$ inches.

If the reader is able to extract square root he will find that if $d^2 = 136$, $d = 11.7$ inches.

But the designer must be sure that $\frac{l}{d}$ is less than 60.

Here $l = 180$, $d = 11.7$.

$$180 \div 11.7 = 15.5$$

Which shows that Formula IV could be used and our design is safe.

Another problem with which the designer must be familiar is this: Given a certain column and the load it is carrying, is the column safe? That is, what factor of safety is used?

Suppose a 10 by 10-inch white oak column 20 feet long is carrying a load of 50,000 pounds. To find the factor of safety—that is, to find what part of the breaking load is actually used.

In Formula III substitute $l = 20 \times 12 = 240$ inches. $d = 10$ inches. $A = 10 \times 10 = 100$, and there results

$$\frac{W}{100} = 3{,}500 - \left(\frac{8}{10} \times \frac{240}{10} \times \frac{240}{10}\right)$$

$$\frac{W}{100} = 3{,}500 - 461 = 3{,}039$$

Then $W = 100 \times 3{,}039 = 303{,}900$ pounds.

Since it takes 303,900 pounds to break the column, and it carries but 50,000 pounds, the factor of safety is equal to $\frac{303{,}900}{50{,}000} = 6$, approximately

The next article will take up other forms of column formulas in common use.

✣

How to Build the Foundation

(Continued from page 96.)

such case the surface of the wall must be as nearly absolutely dry as possible. If it is definitely known that the foundation will not have to withstand water pressure, the inside plaster coating may be dispensed with if desired.

Basement Floor

The most practical basement floor is made at least 4 inches thick of 1:2:3 mixture of cement sand and pebbles or stone, thoroly mixed with sufficient water so that moisture will flush to the surface under light tamping. The floor may be laid in the usual manner prescribed for sidewalk construction, taking extreme care to fully compact any recently disturbed sections of the sub-base. If there have been any excavations for water, sewer or other pipes, or fills to bring portions of the sub-base up to the proper level, these must be thoroly moistened and compacted or cracking of the slabs, from movement of the earth beneath, is almost sure to result. In residences and other buildings of moderate size, where the basement floor is not exposed to great extremes of temperature, it may be laid as one slab, preferably with heavy tar joints, as shown in Figs. 1 and 5, to prevent the possible ingress of water thru cracks between floors and walls. Basement floors are usually sloped at the rate of about ⅛ inch to the foot toward center drains provided with traps which do not permit the passage of back water.

Except in locations where the natural drainage is excellent, it is advisable to tile around the walls as indicated in Figs. 1 and 5. For this purpose 6-inch drain tile should be used, being laid on a trench floor approximately level with the bottom of the footing with a clearance of at least 6 inches between tiling and wall. The tiling should be laid according to standard practice, with ⅛ inch to ¼ inch space between, and in a straight line. The tile should be covered, to grade, with lightly compacted gravel or cinders, in order to form a bed thru which surface water may easily filter to the tile.

One of the principal functions of the tile drain is to relieve the basement floor of possible destructive water pressure from below. A head of water only one foot, under conditions of direct pressure, might be sufficient to lift a concrete basement floor, unless held down by means of adequate reinforcing.

Colors for Interior Surfaces

ANOTHER ARTICLE OF AN INTERESTING SERIES ON PAINTING AND DECORATING — CHOOSING COLOR COMBINATIONS

By C. M. Lemperly

IN a previous article I referred to color schemes for exterior surfaces and told how different colors tended to give different architectural effects.

Interiors are still more susceptible to color treatment and decorative effects can make or unmake a home.

Color can be thought of alone or in combination, but is never dis-associated from a surface or object. Color materially affects the appearance of these, according to the speed with which the light rays travel. Red is designated as the aggressive color, inasmuch as its light rays travel fastest. Blue on the other hand is the receding color for the opposite reason. However, the strength of color has much to do with the actual result. A dull red does not bring a surface, apparently, as near the eye as a brilliant red, while either a dull red or a very pale red may appear farther away than a very bright blue. Red is usually employed for the hangings about a stage, giving it the appearance of being nearer the vision of the audience. For the opposite reason the dullest blue or black is excellent for backgrounds where the feeling of space is required, for the show-window, booth, etc.

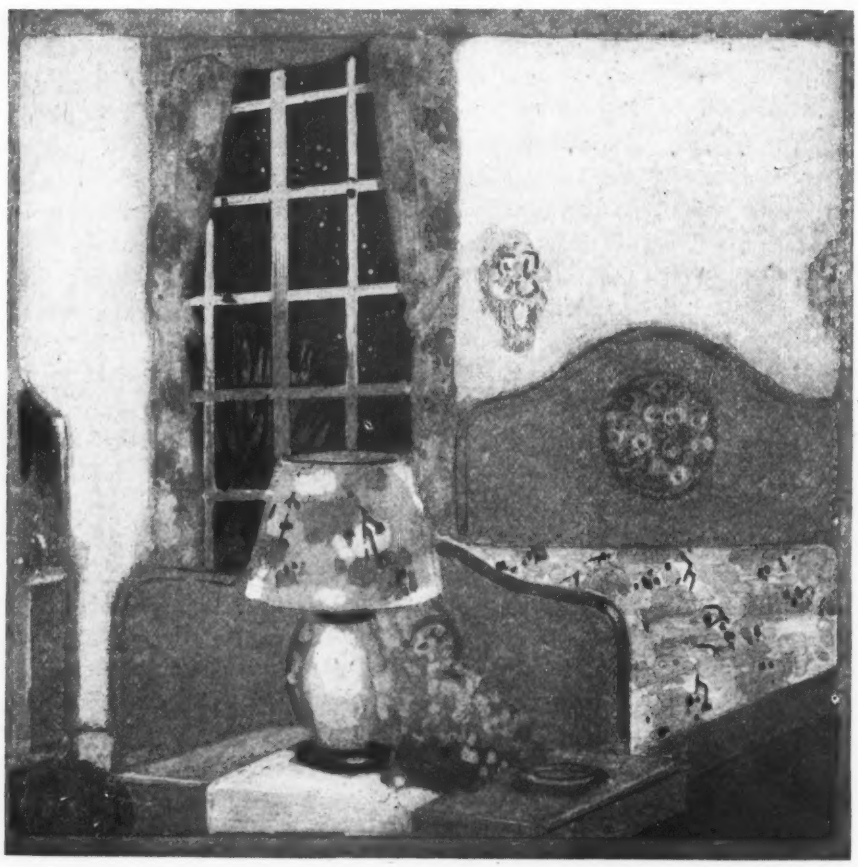
Green is considered a static color, while gray as well as green, unless it is influenced either by yellow or blue, retains its apparent position. Yellow, of which the rays of light expand in all directions, is considered the best color when the apparent size of an object or a surface is to be enlarged without changing the position of that surface. For that reason, orange can either make a surface appear smaller, depending upon the amount of red it contains, or make it appear larger, if the yellow predominates in the mixture which makes the orange. Violet, the next color with which we have to deal, can either be aggressive or receding, depending upon the amount of red or blue which it contains. Light violet, like gray, unless it leans more to the red, is a static color.

There are three kinds of color combination of value in the decorative field, whereby any requirement can be met.

1. Monochromatic Harmony—a combination made up of different values of one color or hue, such as a combination of light and dark greens.

2. Analogous Harmony—a combination made up of related colors or colors which lie next to each other in a selected color scale, such as a combination of yellow, green yellow, green and blue green.

3. Complementary Harmony—the color combination made by the use of contrasting colors, namely, colors which lie opposite each other in a selected color scale, as red and green, orange and blue, violet and yellow or going into the color problem more thoroly, a red-orange finds its complement or opposite in a green-blue, while a blue-violet should be combined with an orange-yellow when a harmony by contrast is required.



Colors on Interior Surfaces Determine to a Great Extent the Cheerfulness and Charm of a Home. This is Particularly the Case in Bedrooms. This Drawing Shows an Attractive Color Scheme.

Combination 1 can produce a restful appearance, tho to some individuals it has the tendency to become tiresome. Combination 2, related colors, produces interest, it avoids monotony. This is the safest combination to use, unless one is thoroly familiar with color. Combination 3 makes for the greatest interest and produces the most individual results. No matter how a combination of colors is selected or how many hues are used in one combination, the surface which the combination decorates should present the appearance of one leading color or the unity of such a surface will be destroyed, whether it be a wall surface, a chair covering, a window drapery or even an exterior of a building. One color should

predominate, and should produce a general effect of either a green or a blue thing, of a yellow thing or a gray thing.

When color is applied to the confines of a room or any interior of any kind, the limitations of wall, ceiling and floors must be considered. The color problem is unlike that for exterior surfaces, tho the architectural construction, as for the exterior, must be maintained. The floor must give a feeling of strength—walls, of stability; ceiling, of protection; while doors and windows in themselves, should perform their functions as doors and windows. The doorway, therefore, should never be so heavily draped that it is no longer an opening, nor should furniture be arranged to destroy this feature. As windows are introduced for light and ventilation, their treatment should also respect such functions.

Even Hunting Lodges in a Far-Off Woods Can Be Made Cheerful by Interior Decoration and the Skillful Use of Wallboard. This One Is Rather Inviting.

Color is highly important in the interior. Light, warm colors may make a dark color room appear just the opposite. The clever decorator makes use of horizontal and vertical lines, as well as color, lowering the apparent height of the rooms by using horizontal panels of either woodwork or color and increasing the apparent height of the low room by means of the vertical. The latter appearance can also be secured by the use of a color, employing a very light value of a color on the ceiling, a slightly darker value for the wall, and still darker, tho not necessarily a very dark color, for the wood trim and then using hangings at the doors and windows which are in contrast with the room color. Needless to say that such hangings should not be draped, but made to hang straight. In the room which is not only low but small, the lighter colors are essential. In a fairly large but low room, the ceiling should be very much lighter than the wall color, altho the latter need not be light.

The placing of mouldings in the room which is too high for its length and breadth will not only lower the apparent height, but will increase apparently the length and breadth. In order to secure best results, colors should be used which are in harmony by contrast and the horizontal panels of color should be arranged from light to dark and from weak to strong. A light buff on ceiling, a dark or a medium buff on the middle wall, a rich dark blue for the dado or lower wall, will give to a high room a very much broader and lower appearance. The use of the plate rail, which is usually placed about two-thirds up from the floor line, lowers the apparent height of the room, tho not to as great an extent as the introduction of drop moulding and chair rail divisions. It is therefore essential to avoid such divisions in a low-ceilinged room. If divisions of this kind have been introduced in such a room, the colors used on the surfaces and the woodwork should be so arranged that the divisions will not be accentuated. When it is possible, vertical divisions can be used below the plate rail, or chair rail, to add to the apparent height of a room. By using a color in the panels thus formed, which contrasts with the color of the vertical stripe, the apparent height will be increased.

Light colors are desirable in the rooms where the lighting is not exceptionally good and where furnishings are of such character that the light tints must be used to give best results. Any piece of furniture, unless it is so good in line that it will act as a center of interest, should not be strongly contrasted with the wall color or with the color which forms its background. Therefore, enamel furniture or wicker in a very light stain, requires a fairly light wall. Dark wall colors are practical under certain conditions, but with the modern wall finish which can be so easily cleaned, it is not essential to resort to dark colors to produce a practical interior. Too dark a color scheme has a tendency to make the atmosphere of an interior heavy and uninteresting, unless intense clear color is so introduced that the room glows with light. The Chinese appreciates the value of a jar of rich deep red glaze in a black room, while a spot of orange is cleverly introduced in a nocturne of blue.

The so-called cold colors, mainly the greens which do not contain much yellow, the blues and violets which do not contain much red, as well as the cold grays, are excellent in rooms which are exposed to the full rays of the sun the greater part of the day. On the other hand the warmer colors are desirable for north and northeast rooms. Bright colors are essential in rooms which are not occupied continually.

Putting the Sunshine into Factories and Shops

DAYLIGHT STEEL SASH PROVIDES AMPLE NATURAL LIGHT AND ADEQUATE VENTILATION AND HELPS KEEP EMPLOYES CHEERFUL AND SATISFIED

MUCH is said and written about modern factory efficiency but in most cases the so-called "efficiency experts" overlook fundamentals. As in the case of football the coach may train his men in all of the fine points of the game but forget the basic principles and as a result he will not get the results which he should. When figuring the efficiency of a factory or shop, the investigator should keep in mind two fundamental factors which vitally affect output. These are good lighting facilities and plenty of fresh air.

Both are essential to the health and satisfaction of the employes. Without them the workers are inclined to be sluggish and dilatory. However, with plenty of fresh air and good natural daylight available, they show the effects immediately in the quality and quantity of their output. Strain on the eyes is relieved, the poisonous gases which tend to kill energy and initiative are driven away and healthy bodies have full play in a healthful atmosphere. Consequently it is not a real test if these two important factors are overlooked.

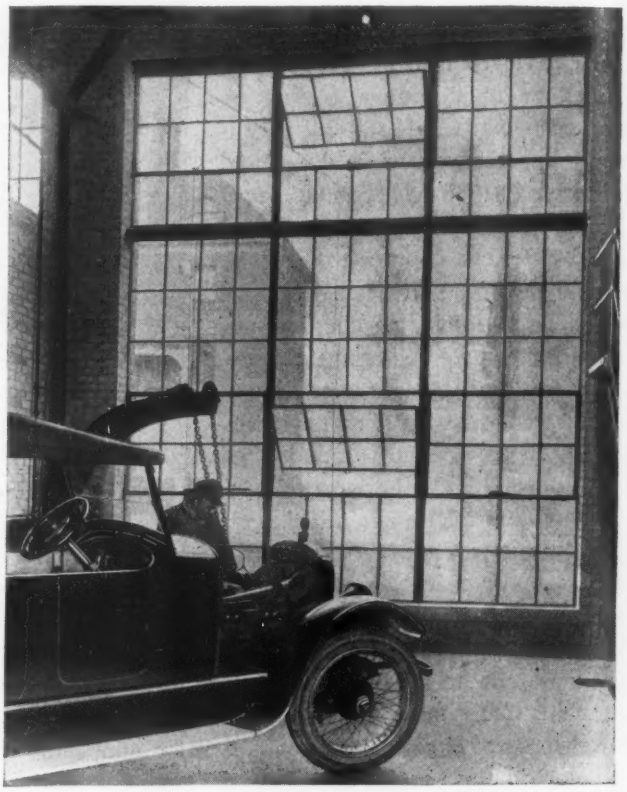
Building experts were among the first to recognize this condition, and set about to remedy it. The name "sweatshop" had become a disgrace to the industrial world. Revolutionary ideas in factory construction were introduced, and none more far-reaching in its happy consequences than the so-called daylight window or curtain wall. This consists of steel sash made up almost entirely of glass.

Factory building today stresses this type of construction. The side walls are walls of glass, broken only here and there by supporting posts and columns. This construction makes accessible every available inch of floor space to the sunlight.

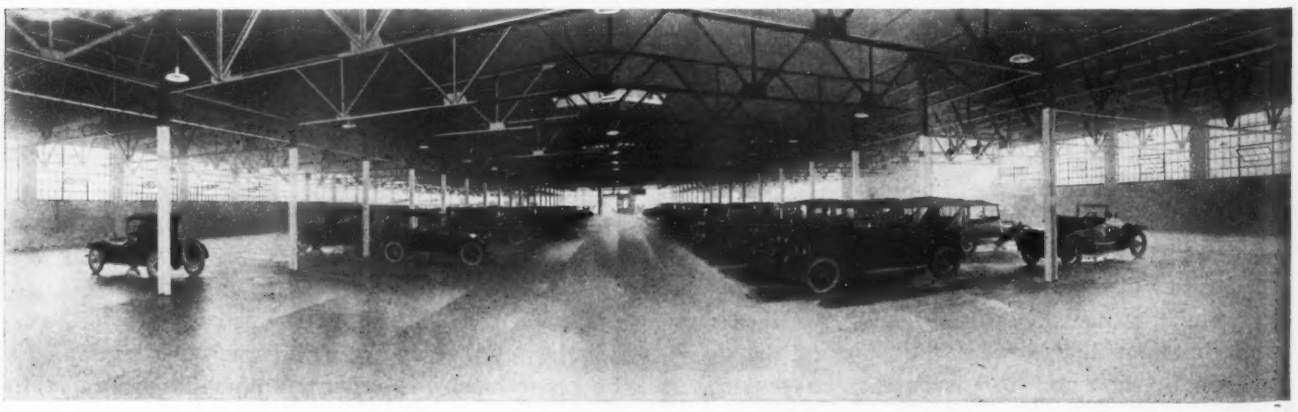
In one of the illustrations shown here is a garage lighted by large areas of steel sash in the side walls. This garage is said to be one of the largest single floor structures in the world. Between 1,500 and 1,600 cars can be stored on a single floor, which has a total of 137,000 square feet of space. The garage is 187 feet in width.

The ventilators in the great expanse of sash make possible the clearance of an accumulation of smoke and gases of a morning, which, when the cars are coming and going in great numbers, make the air a thick blue haze.

In the other illustration the workman is shown taking advantage of the natural daylight provided by the side-wall sash. Officials of the garage have found their artificial lighting bills cut almost to nothing because of these windows. Furthermore, it has greatly increased the efficiency of the workmen because it relieves the strain on their eyes. The quality of workmanship is improved.



One of the Repair Rooms in the Crosstown Garage, Detroit, Mich. The Advantage of Daylight Sash Is Shown Very Clearly in This Picture. Officials of the Garage Have Estimated That Their Lighting Bills Have Been Greatly Reduced and the Efficiency of the Men Increased.



Sunshine Is Plentiful in This Great Single Floor Garage, Considered One of the Largest of Its Kind in the World. It Holds 1,600 Cars. The Sash Ventilators Make It Very Easy to Get Rid of the Gas Fumes Arising From the Moving Cars.

Gambrel Roofs for Hog Houses

ADVANTAGES OF THIS ROOF TYPE FROM STANDPOINT OF LIGHT, WARMTH, VENTILATION AND SANITATION

By C. L. Atwood

LIGHT, airy hog houses, will be sanitary if the air is not admitted in draughts, and there is one style of construction that conforms best to a comprehensive plan of ventilating, lighting and warming. That style of construction is the gambrel roof, as shown herewith.

Sanitary windows are all inserted in one side of the roof, which should invariably face the south. There should be a series of windows for the benefit of each pen. A two-pane window, with 10 by 28 glass is a good size, and a puttyless metal window is finding favor with farmers because of the fact that it is so easy to install.

It will be noted in the diagram that rays of light from three rows of windows would reach every part of the hog house. In the winter time this would mean not only a maximum amount of light, but a great deal of warmth.

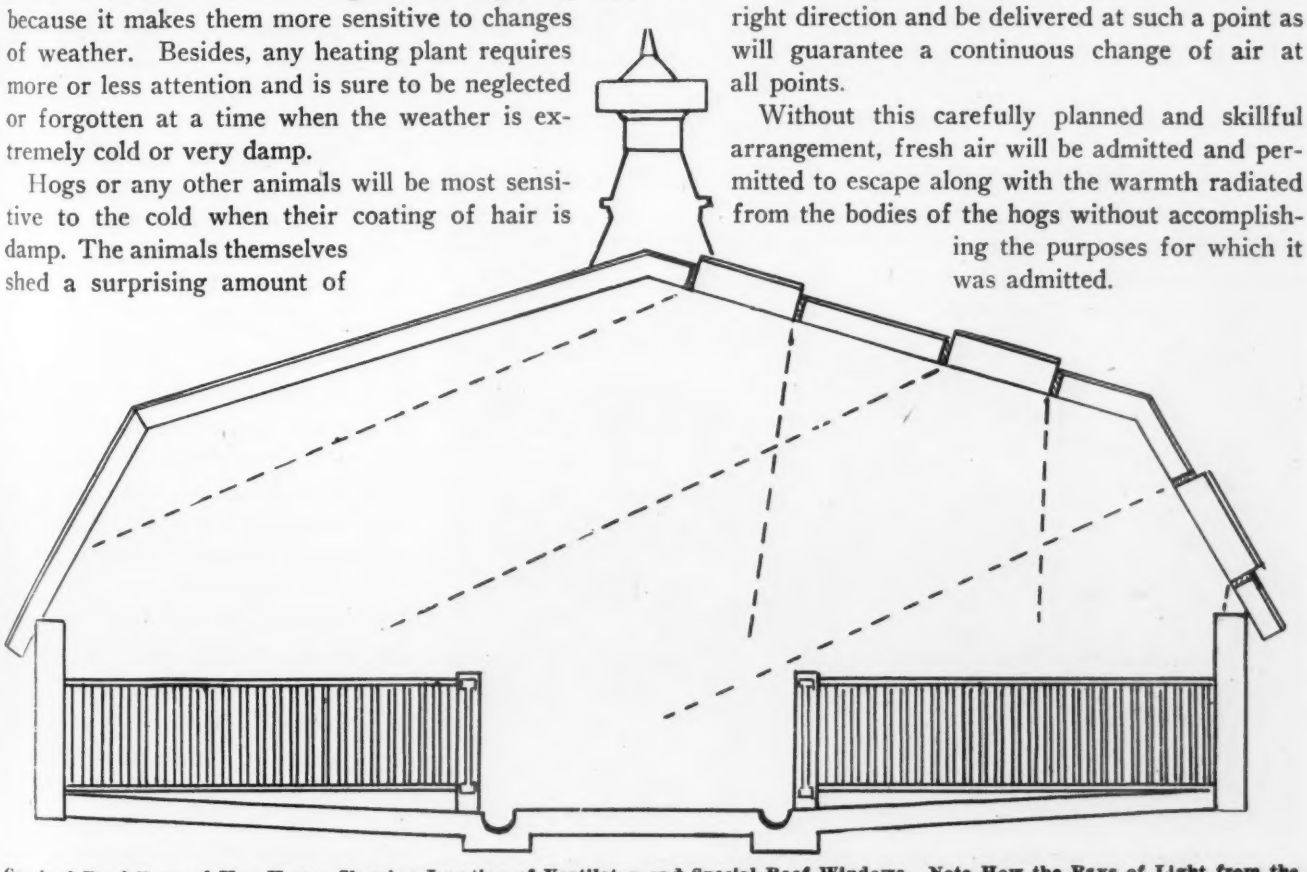
A hog house so lighted would not need artificial heat of any kind in any temperature usual in any of the states of the Union—provided a proper system of ventilation is installed to take off the foul air and moisture. Of course, the rays of sunshine would dry up a great deal of the moisture, but a ventilating system would take it out thru the vents, which would be working on rainy and cloudy days as well as sunny ones. Artificial heat is not good for hogs, anyway, because it makes them more sensitive to changes of weather. Besides, any heating plant requires more or less attention and is sure to be neglected or forgotten at a time when the weather is extremely cold or very damp.

Hogs or any other animals will be most sensitive to the cold when their coating of hair is damp. The animals themselves shed a surprising amount of moisture every day and the sunlight from windows arranged as shown here will dry up a large percentage of that moisture, and a hog will feel warmer and be more comfortable in a dryer atmosphere of exactly the same temperature. Hence, the stock will be benefited in two ways by the gambrel roof windows, with southern exposure.

Window ventilation, either in a roof or the side walls of a building, affords negative ventilation. It is certain that they admit some fresh air and some weather and let out some foul air, but they do not and cannot furnish a dependable, efficient means of taking out the foul air and supplying enough fresh air to completely change the atmosphere at regular intervals all the time. Any kind of hog house should have roof ventilators, because they are active ventilating units which forcibly draw off the foul air and moisture without taking in any outside air at all and do not under any circumstances expose the stock to dangerous draughts.

It is advisable, of course, that these ventilators should be connected with flues which would reach the heavier-than-air gases that hover in the lower stratas. It is also advisable that carefully planned and strategically located intakes shall be provided, because it is not only necessary to supply fresh air in the right quantities, but it is important that it should come from the right direction and be delivered at such a point as will guarantee a continuous change of air at all points.

Without this carefully planned and skillful arrangement, fresh air will be admitted and permitted to escape along with the warmth radiated from the bodies of the hogs without accomplishing the purposes for which it was admitted.



Gambrel Roof Type of Hog House, Showing Location of Ventilator and Special Roof Windows. Note How the Rays of Light from the Windows Reach Every Part of the Hog House. In Winter This Means Extra Warmth as Well as Light.

Electric Light Plant Demonstrating Car Gets Results

SUCCESS IN SELLING POWER AND LIGHT PLANTS MEANS TAKING THE PLANT TO THE FARMER AND SHOWING ITS MERITS

By O. C. Graham

HUMAN NATURE is the same the world over. Every person wants to SEE what he is buying. Especially is it true with the farmer, due to the fact that farmers, as a rule, are suspicious by nature—a condition caused by their more or less isolated mode of living in the past.

Out of a survey just completed it is a well proven fact that the only successful method of merchandising power and light plants in sufficient numbers to bring a profitable business is by the use of a demonstrating automobile—the plant mounted on the rear of an automobile, truck, or on a trailer.

Dealers have tried repeatedly to sell plants to farmers from catalogs and literature. In a few isolated instances this method has been successful, but in these cases the personality and superior salesmanship of the salesman were responsible for closing the deals.

Until such a time when a demonstrating car can be equipped, the most successful plan is to bring the farmer and his family into the store, where an actual demonstration can be made. Here, looking at the power and light plant, he can more readily visualize its possibilities. He sees an object with moving parts that hold his attention and is not forced to draw on his imagination, as is the case with the catalog and circular method of selling.

Make a farmer start the plant himself, make him ask questions about its working parts, and his interest is invariably aroused to the buying point. This is the same method used in successfully selling automobiles. Getting a prospect to ride in and drive your automobile is practically the same as getting him to sign the order, providing, of course, that the car is one that will meet the ordinary requirements of driving and riding ease.

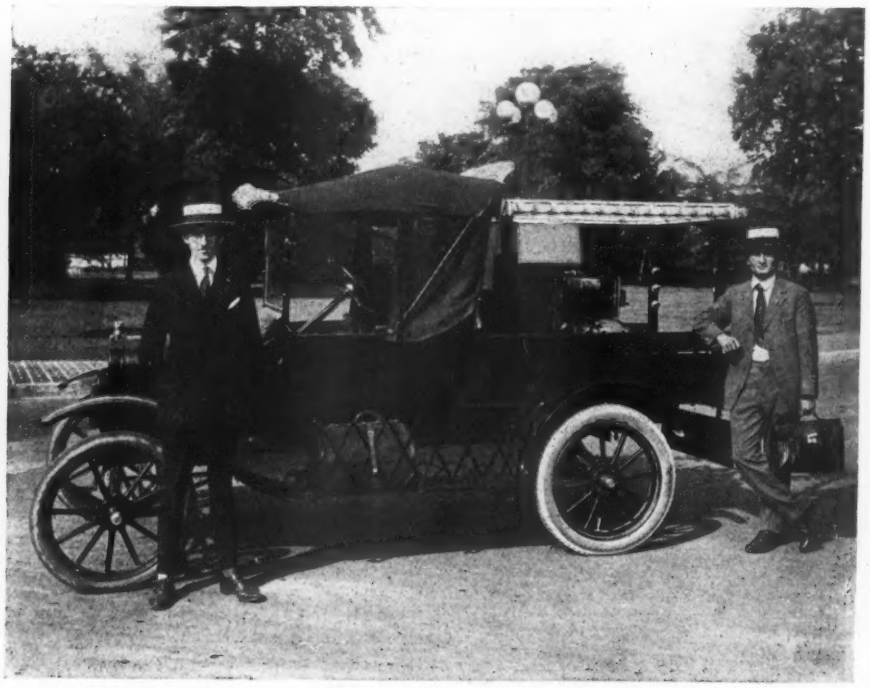
The demonstrating car method of selling is the most economical even without figuring in the increased business resulting from this plan.

At a total cost of less than $50 it is possible to completely equip a car for demonstration purposes. This is, of course, exclusive of the car and any necessary repairs on the car.

With a little ingenuity any dealer can do the work himself. Power and light plants are most generally shipped on "skids" and these same skids may be used for the foundation of the plant in the bottom of the auto body.

In addition to the necessary framework (governed by the type of car selected) a canopy can be built from four 2 by 2-inch uprights with connecting pieces at the top made from ⅞ by 3-inch lumber. Around these top pieces could be strung porcelain sockets with three switches on one of the uprights to control each side and end row of lights. In addition to this string of lights, lamps could also be fastened to the front and rear bows of the top.

A shelf for carrying the rubber jar demonstrating batteries must be arranged for as well as a method of holding the cooling tank, providing it is a water-cooled system.



Many Contractors Sell Electric Lighting Plants in Their Business. These Two Dealers Find a Demonstrating Car Is a Wonderful Stimulant to Getting Real Results Because It Shows the Customer Just What He Is Getting.

A close study of the illustration accompanying this article will give any dealer a score of ideas on the proper installation for a demonstrating car.

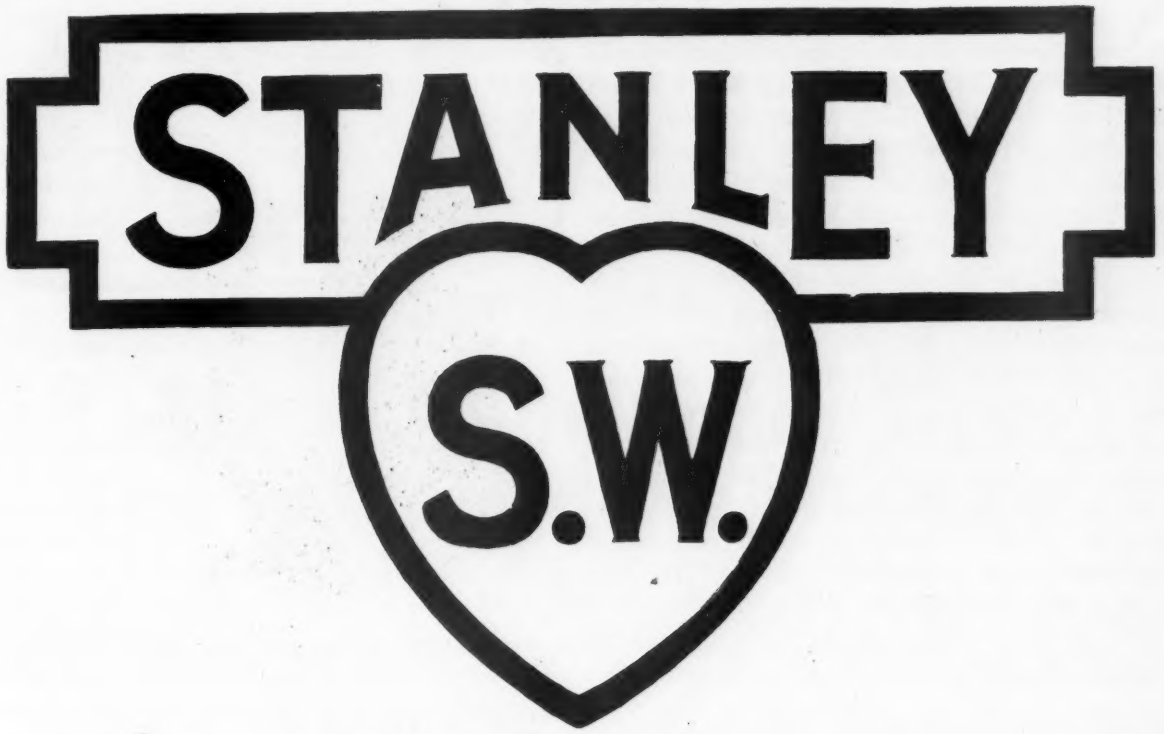
The cost per mile of travel of a demonstrating car on which a thousand-pound unit would be mounted is approximately 8 cents. This figure would embrace all expenses such as gas, oil, repairs, depreciation, expenses for driver and miscellaneous expense (figures based on actual road tests).

On the matter of his demonstrating car one dealer says:

"There is scarcely a farmer in my territory who has not seen my demonstration automobile. I don't see how they could have missed it, for it has been over every road often enough. I'm rather proud of

(*Continued to page 122.*)

Our New Trade Mark!



Announcement

WITH the purchase by The Stanley Works of The Stanley Rule and Level Company a new trade mark, as above shown, has been established. In the future it will be stamped upon dependable

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Making Phonographs During Slack Season

ATTRACTIVE AND PROFITABLE SIDELINE FOR BUILDER WHO HAS WORKSHOP AND BUSINESS INITIATIVE —WORK INTERESTING AND REMUNERATIVE

"NO HOME is complete without a phonograph" seems to be the accepted motto everywhere today—in the cities, towns, villages and farms. Go where you may you will find someone who owns a machine. While it seems a far cry from phonographs to the building profession, yet upon closer analysis we find them very closely connected. This has been brought about by the innovation of the "build your own phonograph" idea. By this, builders, carpenters and cabinet makers who find themselves confronted with a lot of spare time during the winter months, have been able to find a new source of income and in many cases have built up a profitable business of considerable proportions.

Most carpenters and builders have their workshops. Therefore equipment is available. The mechanical parts of the phonograph are furnished by manufacturers with instructions how to install in cabinets which the builder makes himself in his shop. His task is to make attractive cabinets, install the motor and other accessories, and then be ready to offer to his community a first class machine at a very reasonable price.

There are several important features which enter into the correct building of phonographs which should be mentioned. While the cabinet may be designed according to the individual ideas of the builder embodying such features as he may select for size, finish, etc., care must be taken to see that the sound chamber and motor board to which the motor is attached are made correctly. The sound chamber must be arranged to give a proper diffusion of sound waves and for this reason it should be smooth and highly polished. Wood is the most resonant material for this work.

Assembling the Phonograph After Cabinet Has Been Made. Many Builders Are Making Good Profits Building Phonographs to Sell.

The shape of the tone chamber is also important and it should be so designed as to gradually enlarge the opening from the tone arm without being too abrupt. The ideal motor board is built of several ply wood with the grain running in opposite directions, thus preventing warping, and the board should never be less than ½ to ⅜ inches thick.

Complete directions for assembling the machine after the cabinet has been made are furnished by manufacturers who have prepared elaborate blueprints and directions.

Many builders have found this work highly remunerative, many machines bringing as much as $150 and $200.

Mr. Kusenstrintz, of Goshen, Ind., Is a Wood Carver and Cabinet Maker. He Has Built Many Machines Which He Has Sold at a Nice Profit.

Demonstration Car Gets Results

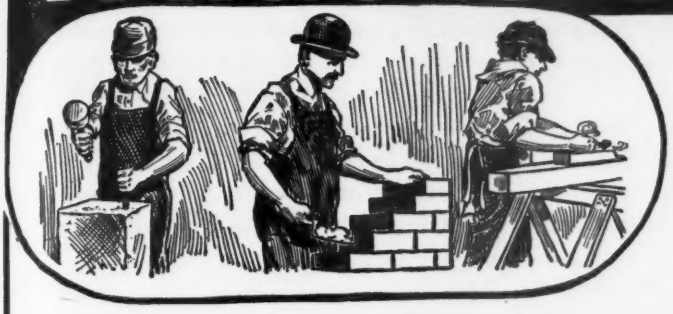
(*Continued from page 120.*)

this outfit. I have reason to be, for it has cancelled more notes than any other thing connected with my business. *I do not believe the farm power and light plant business can be made successful without a demonstrating car.* Today I have two of them—the original one for myself and a new one for my salesman. They both pay and pay big.

"And those two cars work both day and night, for I am a firm believer in the fact that *a power and light plant sale can be closed more easily at night than at any other time.*

"Just give me an opportunity to run a wire with a big, bright globe on the end of it into the farm kitchen when the housewife is doing up the supper dishes after a hard day's work; then let me move that same lamp into the sitting room and let the whole family read in comfort, and I will mighty soon show you an order for a plant or a definite promise to buy one just as soon as that farmer can arrange the finances.

What Is Your Job?



ARE you the man who is bossed—are you doing the hard work while some other man gets the high pay for telling you what to do? Why not be the boss yourself? The only difference between you and the men higher up is in what they know that you don't know. They get their big pay and have the easy work because they know how to direct you and other workmen. If you could read blue prints, estimate on work, know how to direct construction, you too would be in the big pay class. Read below how you can get this knowledge and be a bigger man in your line.

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At home—in your spare time—you can get instruction *by mail* from the experts of Chicago Technical College. You can learn all the higher branches of your trade and soon know as much or even a good deal more than the man who is bossing you now. If you are a workman, you can train for a foreman's or superintendent's job or you can look ahead to being a contractor in business for yourself. This training doesn't cost much and you can pay on easy terms. Look into this now. Just send the coupon below and get catalogs and full information.

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Estimating mill work. Labor and material for window and door frames, sash, blinds, base board, wainscoating and all kinds of closets, cupboards, etc. Lathing and plastering, sheet metal work, exterior and interior marble jointing and decorating, glazing, plumbing, heating, wiring, etc.

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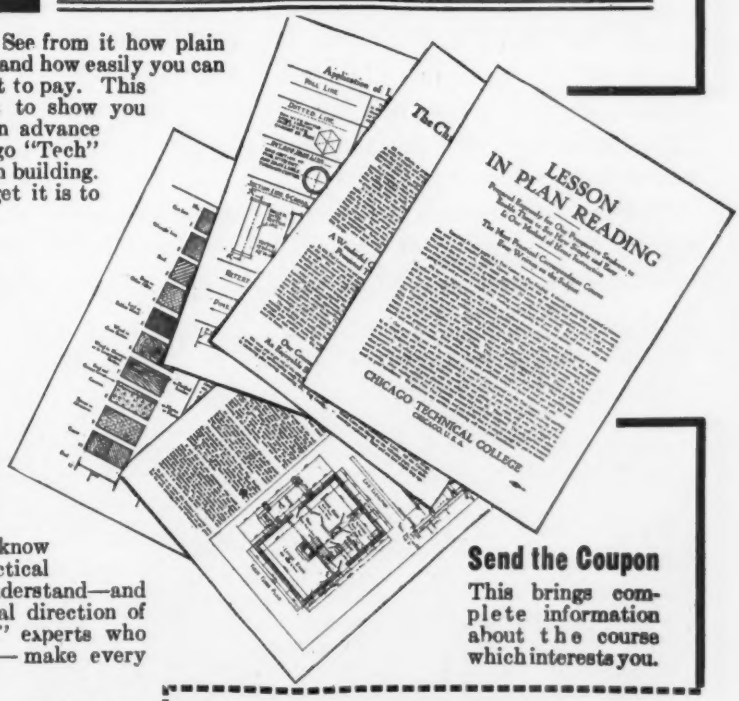

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Concrete Blocks Are Stepping Stones to Success

MILWAUKEE CONTRACTOR LOST SEVERAL HUNDRED DOLLARS ON FIRST JOB, BUT DID NOT LOSE HIS FAITH IN POSSIBILITIES OF BUILDING MATERIAL

By Geo. H. Carter

IF you worked like a Trojan on your first building contract only to find, when the job was complete, that you were several hundred dollars out, would you throw up the business as a bad bet? Perhaps you would not, but there are many men who would. But A. W. Friske is not built after the "giving up in disgust" pattern. He is made of sterner stuff and consquently when he and his partner lost money in their first building job, they did not throw up the sponge.

That was fifteen years ago. Mr. Friske, a young man, and a young partner became interested in the manufacture of concrete building material, then an infant industry. They each had another business, but were interested in concrete, altho they knew very little about it. Mr. Friske had been dabbling in other building material for some years before and always had a keen interest in that phase of work. So he and his youthful partner took up the concrete work as a side line.

They got a contract to build a house, bought a machine, hired some men and built their blocks right on the lot where the house was to be built. While making blocks for the house they made enough to sell around the neighborhood. When the job was finally completed, the two young builders found they were several hundred dollars out, but as Mr. Friske says, "We had learned something about the business." He considered the money well spent.

They then went into the concrete block game with a zest, rented a piece of ground, built a small shed about 20 by 40 feet, installed another machine, a mixer, and gasoline engine, and began to devote their entire time to the business.

At that time, in order to get their product on the market, it was necessary to take contracts and have their own masons do the work. The result of the first six months' business were more encouraging financially and they enlarged their building and increased the equipment.

"In a couple of years," says Mr. Friske, "we were selling our entire product to the contractors and had quit doing the construction work ourselves."

About four years later Mr. Friske bought out his partner and has been conducting the business alone ever since. Three years ago he built his present plant on ground which he had bought. Today he is the head of a modern plant with private switch track running to the factory, and four block machines in operation with a capacity of about 1,500 blocks a day. The plant is also equipped with power tampers and automatic measuring bins for proportioning stone, sand and cement. After the blocks are made they are put on trucks on which they stay in the curing room until ready to be piled in the yard. Mr. Fiske also manufactures white face trim stone for all kinds of buildings.

Concrete blocks were the stepping stones on which Mr. Friske made his climb to success, but his tenacity of purpose and close application to business were responsible factors. His work should be an inspiration to other builders who because of some slight reverse are inclined to "chuck" the whole thing and take up some other activity.

Concrete Block Plant Owned by A. W. Friske, Enterprising Builder in Milwaukee, Wis. Fifteen Years Ago Mr. Friske Signed His First Building Contract and Lost Several Hundred Dollars on It. But He Stuck to the Job and Has Achieved Success.

"Re-roofing" for profit

EVERY old wooden shingle roof in your locality offers a splendid prospect for "re-roofing" profits.

Cover these old roofs with Johns-Manville Asbestos Shingles. It's an easy job because you leave the old shingles on the roof and simply nail the Asbestos Shingles over them, as shown in the illustration.

Roofing felt may be safely omitted. By leaving on the old shingles, you have added insulation and an entirely satisfactory, strong and waterproof construction. Moreover, whether the roof is sheathed or furred makes no difference.

Johns-Manville Asbestos Shingles make a splendid appearance on the roof, but more than that, they are fireproof and practically everlasting.

The first job you do with Johns-Manville Asbestos Shingles will make you an enthusiast—and there's a good profit in every job. Ask the nearest Johns-Manville Branch to show you more about the possibilities in "re-roofing" for profit.

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Incorporated
Madison Avenue, at 41st St., New York City
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Serves in Conservation

Heat Insulations, High Temperature Cements, Asbestos Roofings, Packings, Brake Linings, Fire Prevention Products

JOHNS-MANVILLE
ASBESTOS SHINGLES

Charming Bungalow of Brick

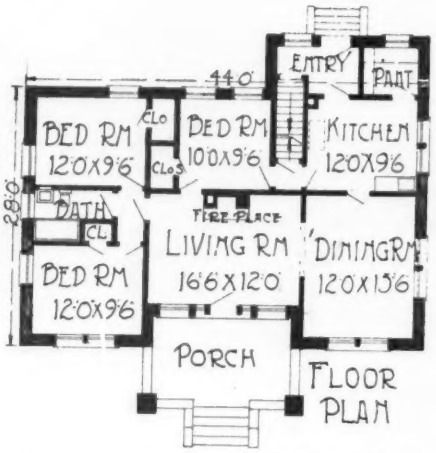
COZY LITTLE HOME HAS VERY INVITING APPEARANCE AND SIX COMFORTABLE WELL ARRANGED ROOMS

THERE is much in the exterior design and floor plan arrangement of this delightful bungalow that will prove not only interesting to homelovers but decidedly enlightening to builders and contractors who are on the search for attractive plans for prospective clients. It shows how well brick can be adapted to construction of this kind. Sturdy and substantial, it rests on a concrete foundation and has solid brick walls, concrete front steps and porch floor.

The front entrance is particularly inviting and suggestive of comforts within. It is made of concrete with brick rails and covered by an extension of the main roof. Just above the porch is a small but attractive roof dormer with three large windows, providing plenty of light to the attic which can be very easily converted into extra sleeping space if needed. The lattice and trellis work around the corners and eaves are a decided improvement and adds to the general hospitable appearance of the dwelling.

Opening the front door, a massive glass paneled piece of highly finished wood, with panels on each side, the visitor steps into the living room, occupying a central location in the floor plan. The open brick fireplace is opposite the door, giving advance notice, as it were, of the comfort and cheer that is to be found within. The room is large and ample, 16 feet 6 inches by 12 feet. On the right is the dining room, slightly smaller—a cheerful room, as all dining rooms should be. It opens into the kitchen, 12 feet by 9 feet 6 inches, the size for efficient homes.

The three bedrooms are small, but not uncomfortably so, and are grouped in one corner of the bungalow. The bathroom is very conveniently located with relation to the sleeping rooms. Each bedroom has ample closet space.



Floor Plan of Attractive Brick Bungalow. It Contains Six Cozy Rooms.

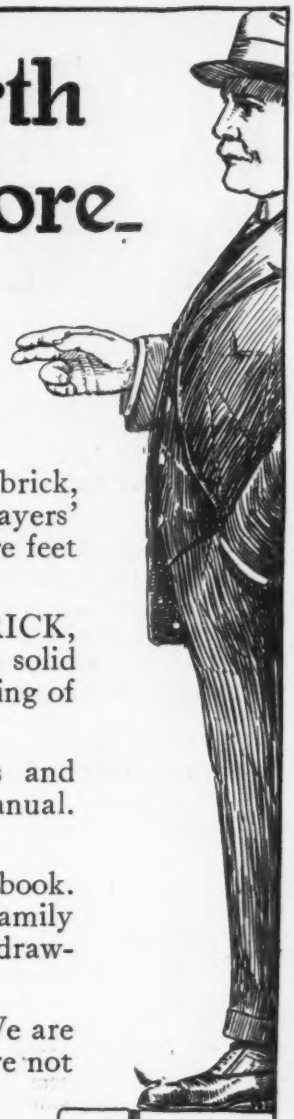
A home of this type will appeal strongly to the man with small family and small income. It can be constructed at a very reasonable cost. It is 44 feet wide and 28 feet long. To the average man the building of a home is a very serious undertaking and he wants to feel that his new home will be permanent and stand the test of years. This cozy little home has been built with these qualities in mind.

✣

WATER transformed into steam expands 1,700 times its volume. One cubic inch of water will produce approximately 1 cubic foot of steam.

A Delightful Little Home That Will Appeal to the Family of Moderate Means. Built Substantially of Brick, It Has a Very Pleasing Exterior and Well-Arranged Interior. Three Bedrooms Are Included in the Floor Plan.

If Your Time is Worth $1.00 an Hour or More—



Can you afford to waste it in figuring when you can *read off at a glance* the information you want?

"BRICK, How to Build and Estimate" will help you.

You can take direct from these estimating tables the number of brick, quantities of materials for mortar of any mixture and hours of bricklayers' and laborers' time for any *thickness and area* of wall up to 10,000 square feet *laid in any bond.*

Hundreds of questions on brickwork are answered in this guide—"BRICK, How to Build and Estimate," a complete manual of information on solid brick masonry construction. It also takes up step by step the figuring of brick costs and contains six full page detail architectural drawings.

Big contractors, small contractors, mason contractors, architects and engineers have written us their appreciation of the information in this manual. Sent for 25 cents postpaid. And be sure to get

"BRICK for the Average Man's Home"—another mighty helpful book. It contains designs in brick for houses, bungalows, cottages, two-family houses and garages—72 pages—floor plans and elevations. Working drawings available. $1.00 postpaid.

You will prize these books—they will save and make you money. We are so sure of this that we are willing to refund the purchase price if you are not satisfied. Send $1.25 and get both books. Use the coupon.

With every building operation it pays to consult an architect or engineer.
Ask them about Brick—they'll tell you.

This National Educational Campaign is sustained by the Common Brick Industry of America. Address Secretary-Manager, 1306 Schofield Building, Cleveland, Ohio.

Gentlemen:

Inclosed find $1.25 for "BRICK, How to Build and Estimate," and "BRICK for the Average Man's Home," as offered in the AMERICAN BUILDER for January. Refund guaranteed if books are not satisfactory.

We are planning on building:

_____

Name _____ Business _____ Town _____ State _____

Demand Brick with this Trade Mark
Your Guarantee of Quality

For Beauty with Economy
build with Common Brick

You Are Requested and Urged to Make Free Use of These Columns for the Discusison of All Questions of Interest to the Building Industry

Needs Information on Store Front Remodeling Job

To the Editor: Durango, Colo.

I would like to ask a little advice thru your columns. I have a large store front to install. The front is 50 feet wide, the building is an old model brick and I have to take out the old I beams and put in new ones. Now I would like to know the best method of holding up the upper story (the building is only two stories) while taking down the old I beams and putting up the new beams. What is the best tackle to use and where can I get them? If any member of the BUILDER family can give me special detailed methods I would greatly appreciate it.

R. C. SALYER.

Seeks Light on Labor Estimating

To the Editor: Culver, Ind.

I have been a reader for some time of the AMERICAN BUILDER and find it a very valuable book. I also see that many ideas are cheerfully exchanged. I wish that some contractor would print a table as to how labor is estimated on house building or any ordinary construction work.

For example, how much floor will one man lay? How many feet will one man side in one day and what is each opening worth in labor? Same in cornice or inside trim in framing a house or any work connected with a modern house?

HARRY L. POROHER.

Tennessee Builder Reports Activity

To the Editor: Hilham, Tenn.

I am sending some pictures of work I have been doing and would be glad to see them in the AMERICAN BUILDER if you have space for them.

No. 1 is a house I built for Mr. E. L. Carrville of Hilham, Tenn. It cost $2,000.

No. 2 was built for Mr. O. B. Reed, Butler's Landing, Tenn., and cost $4,500.

JOE MASTERS,
Carpenter and Builder.

Another Home Built by Mr. Masters During the Summer. This Is Owned by O. B. Reed, Butler's Landing, Tenn., and Cost $4,500.

Joe Masters, Builder at Hilham, Tenn., Built This Home and Several Others Down in That Vicinity. He Reports Unusual Activity. The Cost of This Building Was $2,000.

How Should This Floor Be Laid?

To the Editor: Andisville, Pa.

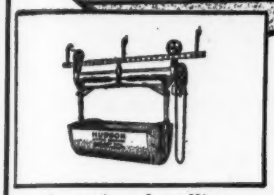
Please advise how floor should be laid under following conditions to give greatest strength:

The joists are 3 by 7, spanned 14 feet and spaced 2 feet on center. There is a sub floor of 1 by 10-inch rough boards over which is a second covering of matched 1 by 6-inch boards. He contemplates using 2 by 8 yellow pine matched flooring on top of this for added strength to carry a threshing rig.

Which gives the best results, to lay it at right angles with the joists or lay it diagonally? Would bridging help any on joists of that dimension?

W. H. GREINES.

Choose the Type You Prefer



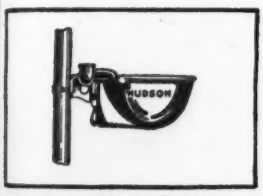
Save time handling manure with a Hudson Litter Carrier

Hudson offers you and your customers the most complete line of barn equipment on the market. You can give your customers just what they prefer in the way of barn equipment. Our big free catalog shows individual steel stalls, or multiple steel stalls—lever operated. Also offers you your choice of tubular or channel steel stanchions, plain or wood lined, with or without leads. In fact—

Hudson Furnishes Everything for the Barn Except Lumber and Nails

No. 10

Hudson stalls are made with many different styles of stanchions, sure-stops, mangers, etc. There are extra sturdy stock pens for all purposes. Hudson easy-running Litter Carriers, either quick raising or rigid types, may be had in several different sizes, for steel or cable track. Feed Carriers made to run on litter carrier track or truck types for floor use. Large capacity easily operated Hudson Hay carriers for the Hay Mow and Hudson Allweather Hangers for the Doors.



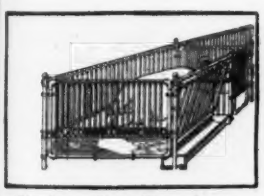
Hudson Water Systems easily installed and trouble-proof

Hudson Quick Detachable Water Bowls

No. 5

Hudson water bowls are non-clogging, quick-acting, cow-proof, easily cleaned. Thousands in use. Hudson also furnishes complete water systems, including all the necessary pipe fittings, valves, together with tank and pump if desired.

Hudson Guaranteed Ventilating Systems



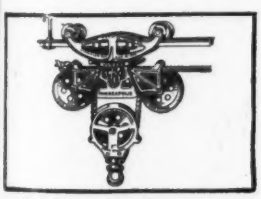
Hudson Hog Pens have many time and labor saving features

absolutely govern the atmospheric conditions of the barn under all weather conditions. Hudson Cupolas are sturdily made, attractive in design. You will find it a great convenience to have the complete Hudson catalog ready to show your customers. No other concern offers you such a complete assortment to choose from.

No. 66

Get Our Free Catalog

We want every contractor to have a copy of the new Hudson catalog. We want you to see for yourself that Hudson goods and Hudson service can't be beat. Just drop us a letter or post card today and ask for free catalog.



Hudson Carriers save time in filling the mow

Free Service to Contractors

The services of our architectural and engineering departments are free to our customers. We gladly offer the services of these departments in cooperating with you on any job on which you are figuring. Let Hudson help you.

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HUDSON Barn Equipment

Answers One Question and Asks Several More

To the Editor: Cambridge City, Ind.

I see in your November number that James Mahoney asks for information about a saw mill. If he will get catalogs of water wheel manufacturers they will give him information as to different heads and sizes of wheels and the speed they will run under the different heads of water. He will have to know the speed his wheel will run before he can get the size of pulleys necessary to speed his saw properly. A saw should run so the cutting edge would travel ten thousand (10,000) feet per minute. A saw 5 feet in diameter the mandred would have to turn 666⅔ times per minute. These small mills runs saws much slower and do good work but do not saw lumber as fast. A saw running 10,000 feet per minute will be 6 inches or more larger in diameter than when standing still. If he runs his saw 10,000 his pulley on mandred should be 20 or 24 inches in diameter. If 20 inches his drive pulley should be 5 feet and make 230 revolutions per minute and others in proportion to speed his wheel will develop. The distance between drive shaft and mandrel should be not less than 25 feet; 30 would be better.

I ran a mill for 11 years and never had a man in it but twice to hammer saws, so if he wants further information and will write me I will answer to the best of my ability. Now I am going to ask for some information. I expect to build a home in the spring and have an idea that I want some help on. I want to put in hot water heat and do away with radiators above the floors. My idea is to lay 2-inch pipes (about 4) lengths between the joist so that the water will circulate back and forth and return to the boiler. Can I use 1-inch pipes to the 2-inch, then 1-inch from the 2-inch back to boiler? In that way the water in the 2-inch pipe would travel only one-seventh as fast as it would in the 1-inch pipe and give off that much more heat than if it was all the same size. I would use floor ventilators above the pipe so they could be opened and closed. Would it be necessary to have a cold air duct for air to come in over the pipe? I would plaster the joist and below with asbestos so the heat would not harm the wood. It could be arranged so the heat could be taken upstairs with hot air ducts and controlled with dampers. What I want to know, is it practical? I want to get away from costly and, I think, ugly radiators. You see big pipe radiators on walls in shops and garages. Why will they not work under the floor? Someone that knows please answer. QUINN LEAPLEY.

✣

Wants to Build a Boat

To the Editor: Havana, N. D.

I have been a reader of your paper for some time and have found it a great help to me in the building line. I would like to ask of some one with experience to give me some information in regard to boat building, such as a two-man rowboat ,and also what wood to use. If some one would kindly write to the AMERICAN BUILDER or to me I would greatly appreciate it.

I am also sending a snapshot of a barn which I helped build in this locality. GEO. M. GUNDERSON.

Large Barn Built by Geo. M . Gunderson, Havana, N. Dak. Note the modern Ventilators on the Roof and Gothic Type Roof.

✣

Explains Cistern Capacity Formula

To the Editor: Herreid, S. D.

In your October 1 number I find in the correspondence department that Holly H. Rickey, Marion, Ohio, wants to know how to ascertain the number of gallons in a cistern. I presume he means a round cistern, and submit the following problem and solution for it:

How many gallons in a round cistern 8 feet in diameter and 8 feet deep?

Solution:

$8 \times 3.1416 = 25.13$, which is the circumference.

$25.13 \times 2 = 50.26$, area of circle.

$50.26 \times 8 = 402.08$, cubic feet in cistern.

$402.08 \times 7\frac{1}{2} = 3015.37$, number of gallons.

Hence this rule:

Multiply diameter by Pi (3.1416) to get circumference.

Multiply circumference by one-half the radius to get area of circle.

Multiply area of circle by depth of cistern to get the cubic feet.

Multiply cubic feet by seven and one-half (7½ being the number of gallons in one cubic foot) to get the number of gallons. Then if you want the number of barrels you can divide the number of gallons by the number of gallons in a barrel.

Any table that one might submit would be too difficult to remember, if it could be remembered at all. The best way is to figure out each individual case. F. C. DRUMMUND.

✣

Mr. Mahoney, a Solution for Your Problem

To the Editor: Maplewood, N. J.

Regarding James Mahoney's sawmill problems of Atlantic City, N. J., he should know the power he has on his main driving pulley and figure his mill saw pulley and belt from this, also his shafting.

For the average light mill of about 12 h.p. a 48-inch saw with 24 teeth should run 350 r.p.m. and to find size of driven pulley multiply the diameter of the driver by the number of its revolutions and divide the product by the number of the driven. For the driving pulley multiply diameter of the driven by its revolutions, and divide by revolutions of the driver. From this, if you use shafting which should not be less than 1 15/16 inch, you can figure all your pulleys. Any length belt 8 inches four- or five-ply but from 16 to 20 feet, works good.

L. J. BARGER.

✣

PHOTOGRAPHS of good farm buildings always are interesting. If you have erected a barn, a corn crib, a hog house or a farm home during the last season, send a photograph of it, and the floor plans, if possible, to the Correspondence Department. It will appear in an early issue.

Successful Operations in Difficult Times

WELL-KNOWN CHICAGO ARCHITECT PROVES THAT NEW HOTEL PROJECTS CAN BE PLANNED AND BUILT, AND OPERATED AT A PROFIT IN SPITE OF RECENT HIGH COSTS

HIGH grade residential hotel construction has been a notable feature of 1920 building. With sky-rocketing prices putting a stop to all other building work these immense hotel enterprises have gone ahead.

The demand for satisfactory living accommodations with freedom from household cares and domestic servant worries has filled all the hotels to capacity. Rentals are easily secured which figure a handsome profit, even on the extra high investment costs that have prevailed during the past year.

The work, in this hotel field, of Walter W. Ahlschlager, architect, of Chicago, has been conspicuously successful. During the past year he has planned, financed and built such noteworthy structures as The Sovereign, The Parkway, The Sheridan-Plaza, The Webster, etc. They are the high water mark in Chicago residential hotel work.

Because of the inspiration and help that a study of these structures in detail will be to the building field at this time, the AMERICAN BUILDER has arranged with Mr. Ahlschlager for this elaborate insert.

THE WEBSTER

THE SHERIDAN-PLAZA

THE ALGONQUIN

THE PARKWAY

THE SOVEREIGN

WORK OF
WALTER W AHLSCHLAGER
ARCHITECT ENGINEER FINANCE

Fiscal Architecture; or the Art of Making It Pay

THE BUSINESS OR INVESTMENT SIDE OF THE SERVICE AN ARCHITECT SHOULD RENDER HIS CLIENTS IN CONNECTION WITH THE PLANNING OF A MODERN HOTEL ENTERPRISE

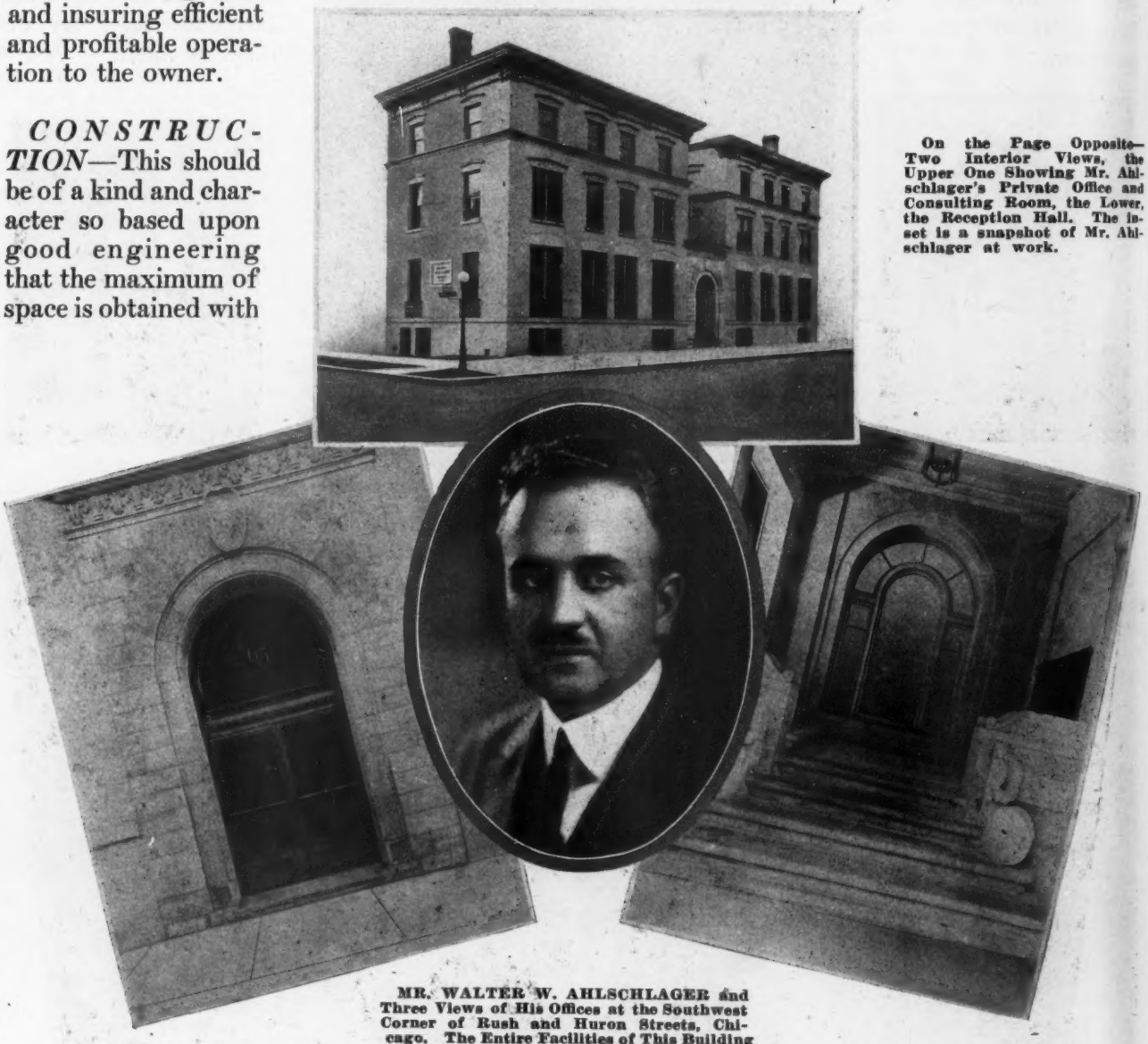
By Walter W. Ahlschlager, Architect

MODERN hotel architecture is divisible into three departments, each of which is absolutely necessary to the success of the other two; namely, *design, construction fiscal.*

DESIGN of an architecturally harmonious exterior and interior, enveloping a well defined plan of subdivisions, exuding pride and comfort to the guests, and insuring efficient and profitable operation to the owner.

CONSTRUCTION—This should be of a kind and character so based upon good engineering that the maximum of space is obtained with the minimum of initial cost, operation and depreciation.

FISCAL—A well analyzed plan of financing giving safety to the buyers of the hotel securities and yet so related as to financing costs, interest charges and maturities, as to justify the hotel owner in assuming the obligations of the securites.

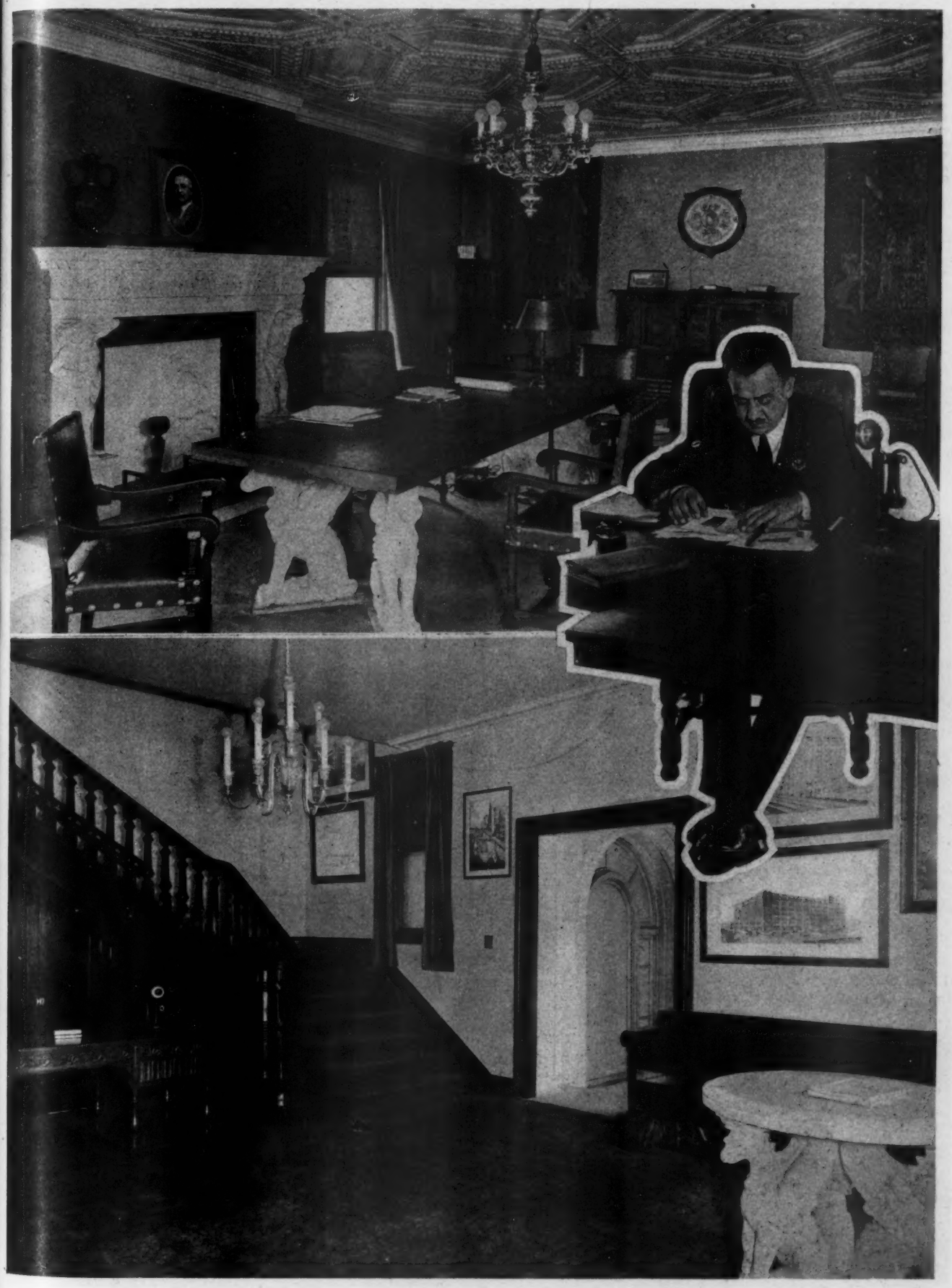


On the Page Opposite—Two Interior Views, the Upper One Showing Mr. Ahlschlager's Private Office and Consulting Room, the Lower, the Reception Hall. The inset is a snapshot of Mr. Ahlschlager at work.

MR. WALTER W. AHLSCHLAGER and Three Views of His Offices at the Southwest Corner of Rush and Huron Streets, Chicago. The Entire Facilities of This Building Are Required for the Draftsmen, Engineers and Executives of Mr. Ahlschlager's Organization.

DESIGN AND CONSTRUCTION OF

PAYING PROPERTIES — RESIDENTIAL HOTELS



WORK OF

WALTER W AHLSCHLAGER

ENGINEER

ARCHITECT — FINANCE

DESIGN AND CONSTRUCTION OF

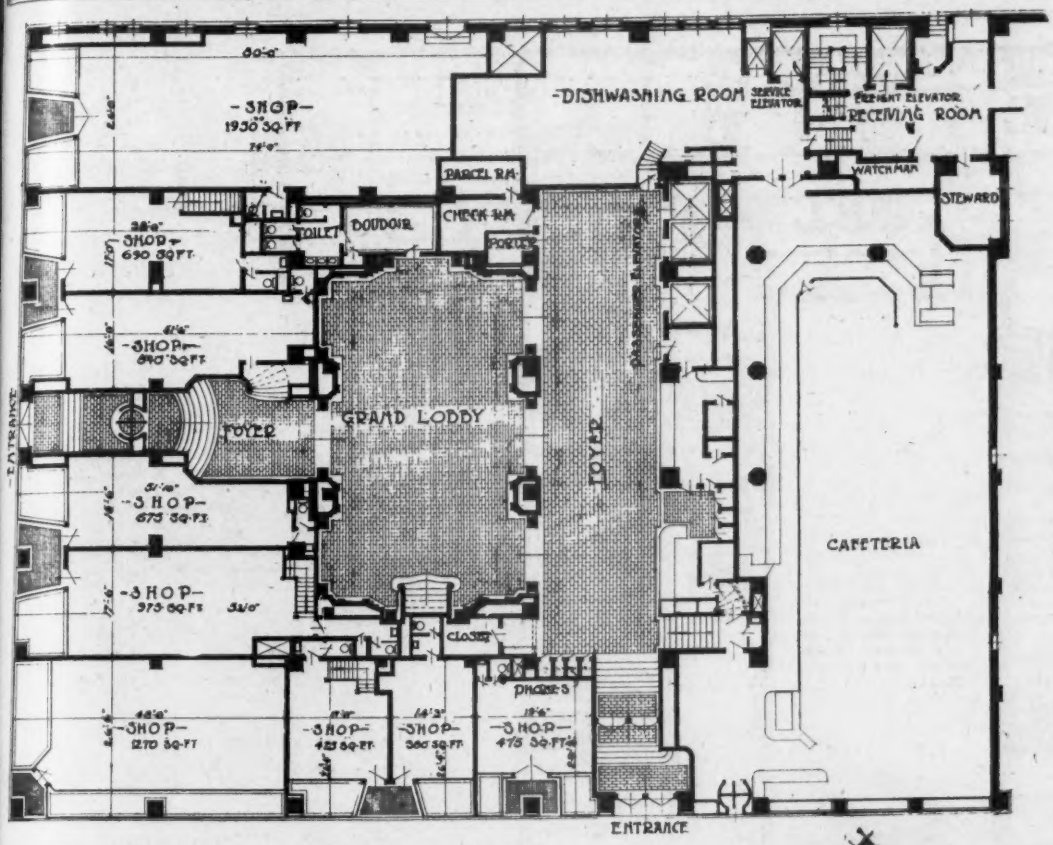
PAYING PROPERTIES — RESIDENTIAL HOTELS

The Sheridan-Plaza Hotel Nearing Completion, at the Northeast Corner of Sheridan Road and Wilson Avenue, Chicago. It is 225x130 Feet, Twelve Stories High. This Is an Example of the Modern Metropolitan Hotel Planned and Built to be Operated at a Profit Under Present Cost Conditions. The Site and Building Are Valued at $3,800,000.

WORK OF

WALTER W AHLSCHLAGER

ARCHITECT — ENGINEER — FINANCE



The Ground Floor of the Sheridan-Plaza Hotel Contains Nine Stores or Shops, With Desirable Street Frontage, the Grand Lobby, the Foyer and a Large Cafeteria. Too Much Emphasis Cannot be Placed on the Desirability of Ground Floor Space in Well Located Hotels for Commercial Purposes. Such Space Should be a Producer of Large Revenues.

The Planning of Modern Hotels

By WALTER W. AHLSCHLAGER, Architect

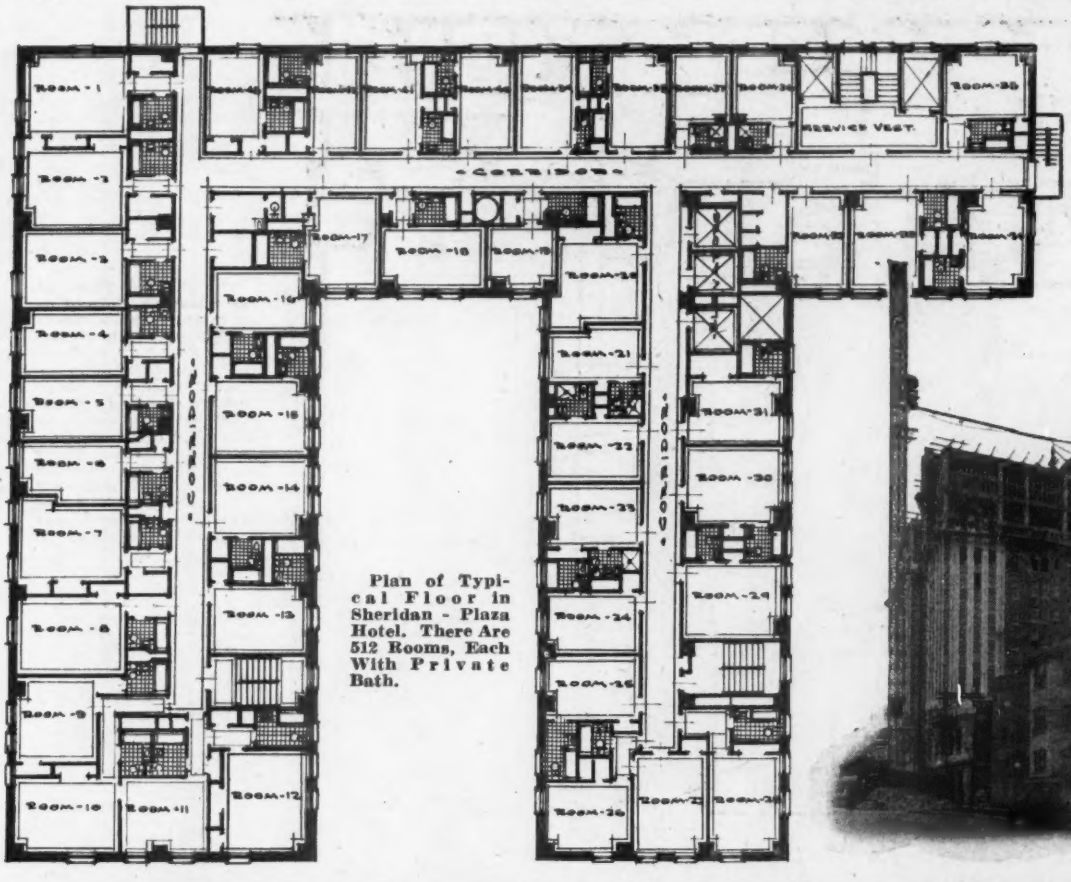
THE modern fireproof hotel of today is the result of modernized conditions of living as required either in the commercial field or in home life. Our intensiveness commercially, or in our homes, demands that we be able to acquire hotel space of a kind and character to suit our every desire and yet at a relatively reasonable price.

To design a hotel to fit these new requirements concentration of space, efficiency of operation, economy of initial construction costs and freedom from extreme depreciation must be arrived at. The solution to this problem is the modern fireproof hotel of today, which consists of many homes in cell formation, so related that the size of each one is so elastic as to the number of rooms arranged en suite that the determination of the number of rooms is dependent merely upon the whim of the occupant. This, in a few words, is the requirement imposed upon the hotel operator of today by his guest, the public.

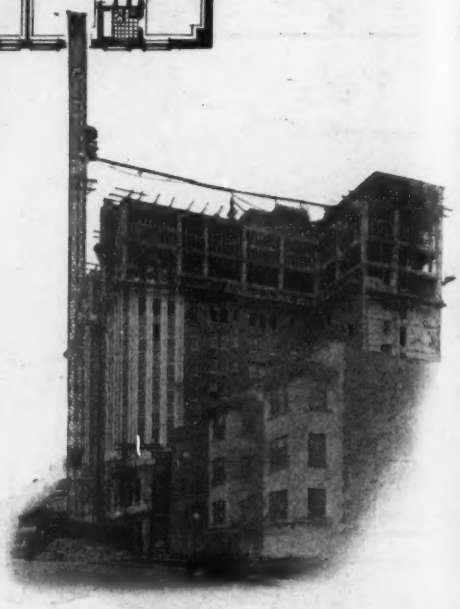
From the viewpoint of the operating hotel owner, this same hotel represents certain investment per unit of room multiplied

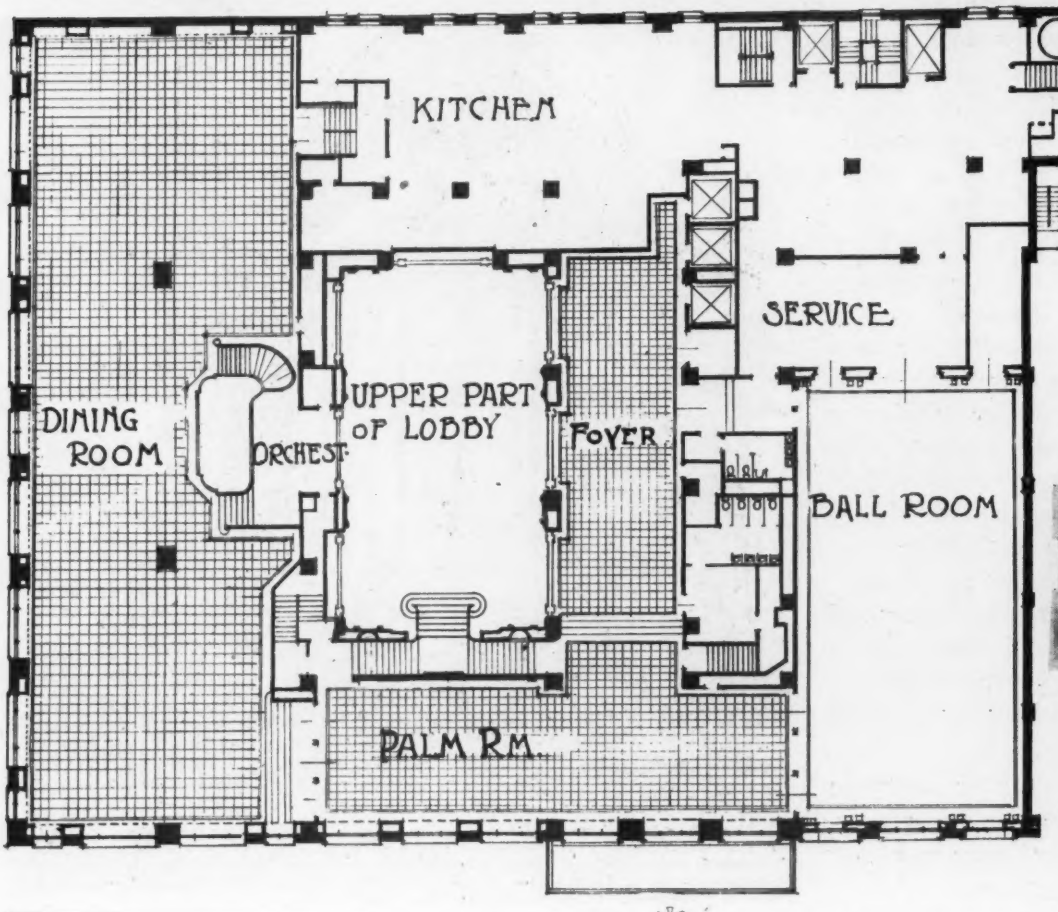
(*Continued to page 137.*)

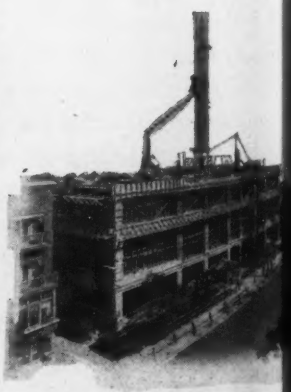
The Sheridan-Plaza During Construction. The Concrete Is Being Poured for the Reinforced Framework of the Upper Floors, While the Masons Are Following Close Behind With the Brick and Terra Cotta Walls. Executive Management of a High Order Is Required for the Co-ordinating and Speeding Up of a Construction Enterprise of This Character.



Plan of Typical Floor in Sheridan - Plaza Hotel. There Are 512 Rooms, Each With Private Bath.







Mezzanine Floor Plan. In This Part of the Sheridan - Plaza Hotel Are Located the Main Dining Room, Palm Room, Foyer and the Kitchen.

(*Continued from page 135.*)

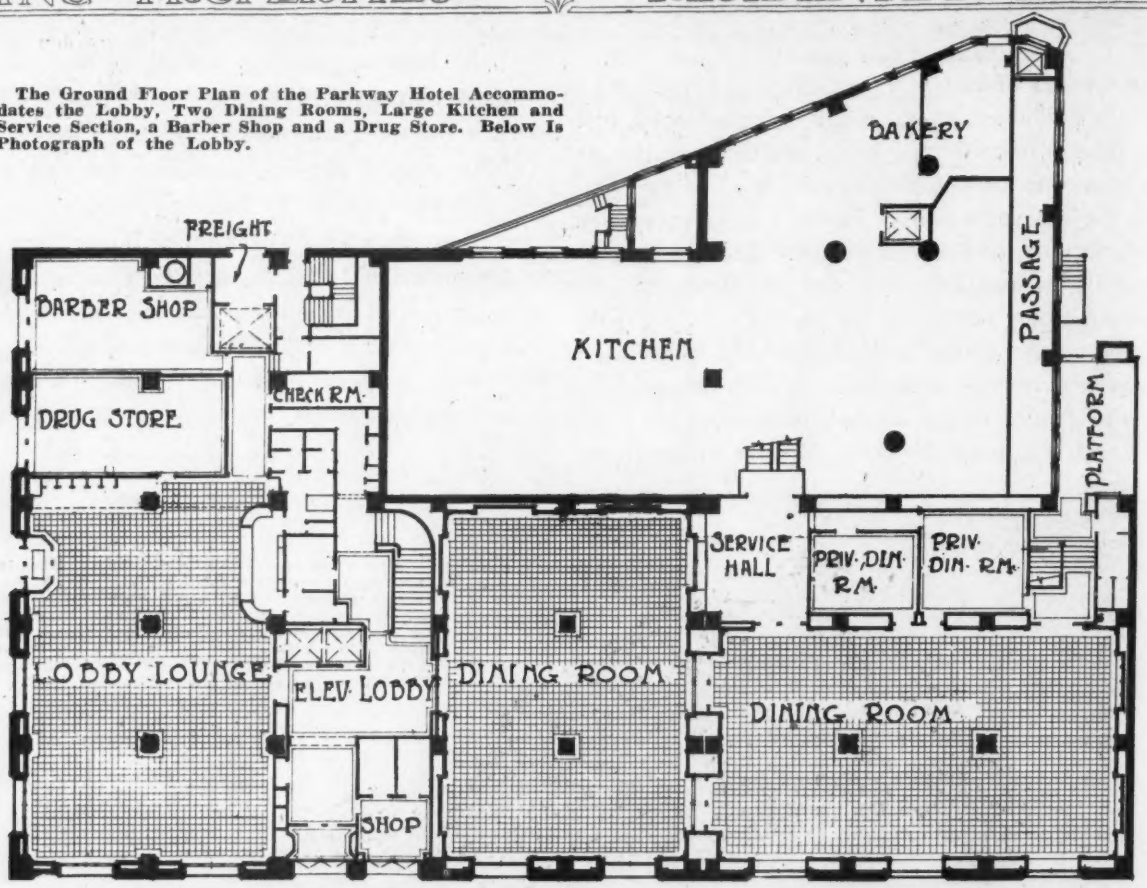
by the number of rooms, to which must be added the necessary public functional rooms, such as lobby, ballroom, dining room, writing room, and the operative departments commonly known as the "rear" of the hotel. All of these departments represent a large investment and a continuous overhead charge. Granted that the location of the hotel be correct and that the operator be capable, the only remaining question which will determine the success of the hotel is the relationship of the various departments of the hotel to each other, and its ability to give to its guest, the public, what the public wants and at a price the public desires to pay for it.

It is, therefore, obvious that the problem of successfully designing a hotel demands a maximum of experience on the part of the architect, and the fullest collaboration of the operator from the very inception of the plans until the building is delivered to the owner for occupancy. Continuing further, it is not even sufficient in itself that the architect shall be experienced and capable in designing hotels thru having previously designed other hotels. He should also be a man who has been actively interested in the ownership and operation of hotels designed by him so that his

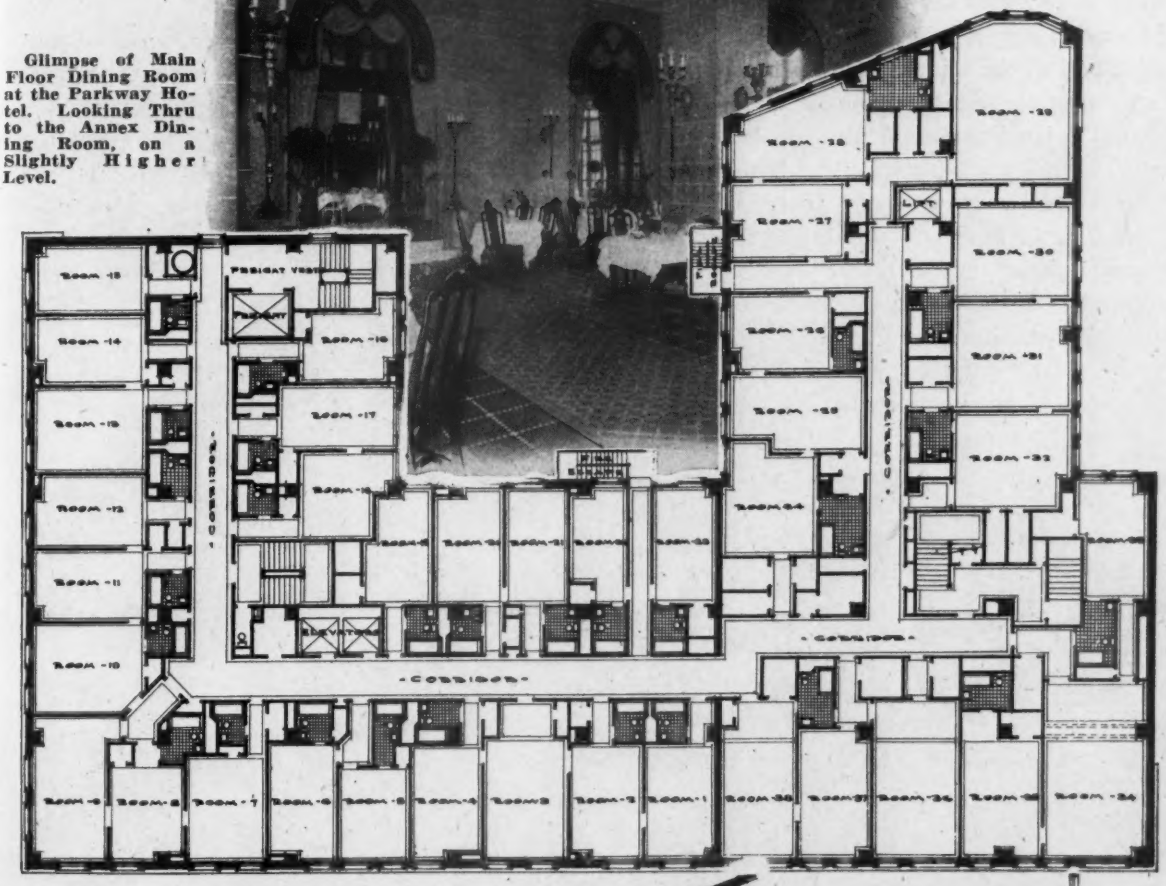
(*Continued to page 140*)

The Parkway Hotel and Annex, Located on the Northwest Corner of Lincoln Park, West, and Garfield Avenue, Chicago. A Fine Example of Residential Hotel. It Is a Fireproof Concrete and Steel Constructed Building of Ten Stories and Basement, Faced With Pressed Brick, Stone Trim. The Upper Nine Floors Are Devoted to 342 Spacious Rooms Planned Very Ingeniously to be Used Either Singly or En Suite.

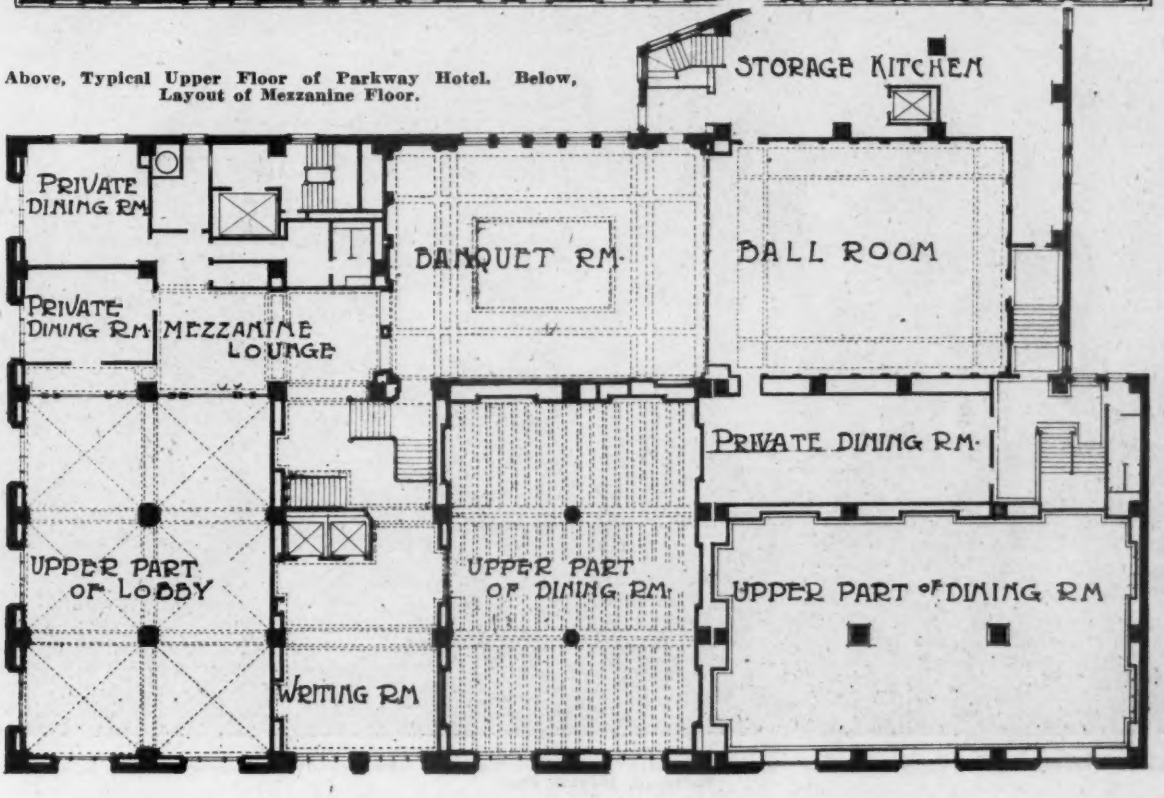
The Ground Floor Plan of the Parkway Hotel Accommodates the Lobby, Two Dining Rooms, Large Kitchen and Service Section, a Barber Shop and a Drug Store. Below Is Photograph of the Lobby.



Glimpse of Main Floor Dining Room at the Parkway Hotel. Looking Thru to the Annex Dining Room, on a Slightly Higher Level.



Above, Typical Upper Floor of Parkway Hotel. Below, Layout of Mezzanine Floor.

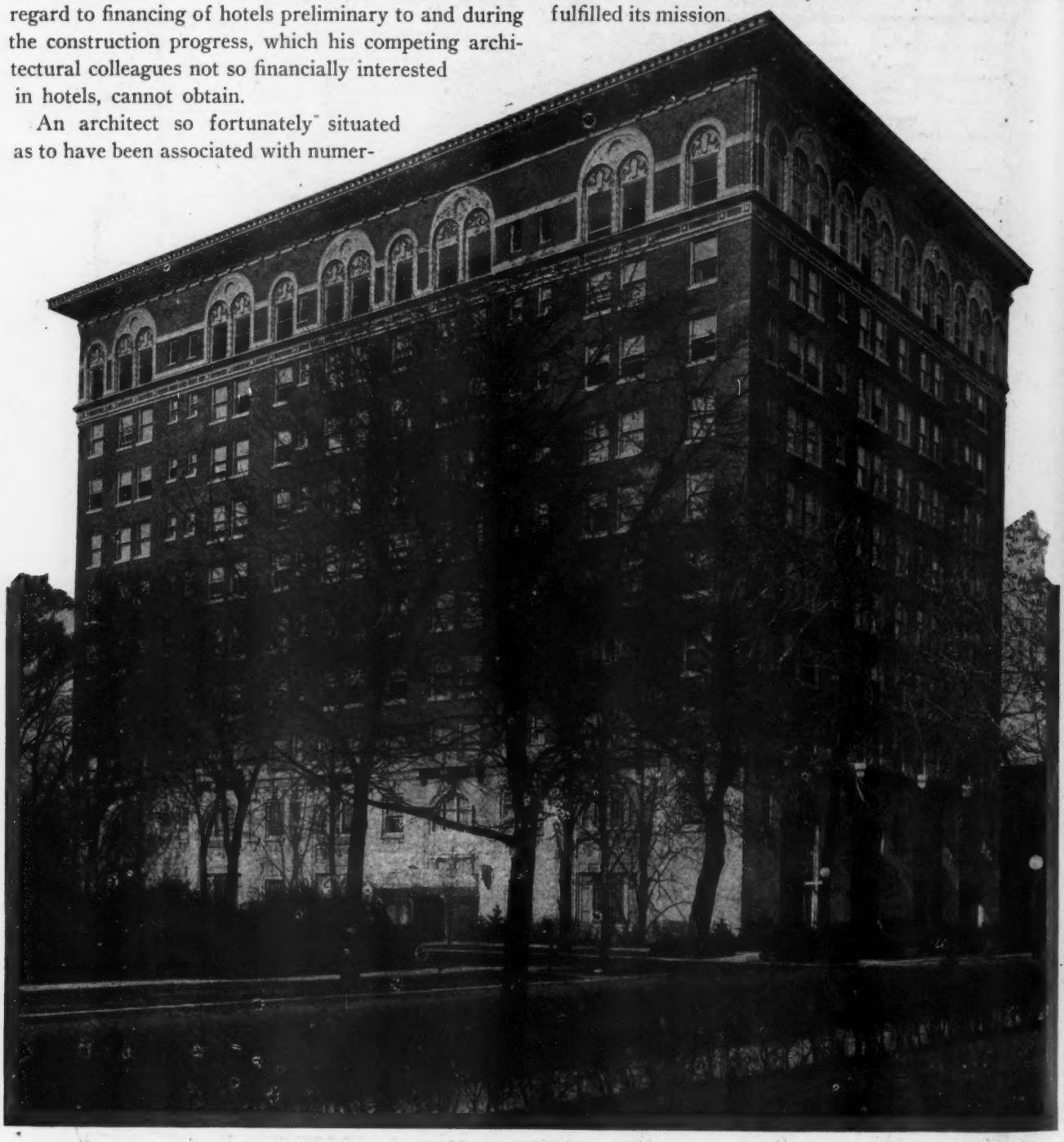


(*Continued from page 137*)

resources will have been at stake upon the success or otherwise of the product of his brain and experience. There is probably no better way in which a hotel architect can learn of the pitfalls of hotel design to be avoided and of the minute requirements that are contributory to successful operation of a hotel, than to have been associated with numerous hotels as owner and operator as well as architect. Again, his association with hotels as owner gives him an experience in regard to financing of hotels preliminary to and during the construction progress, which his competing architectural colleagues not so financially interested in hotels, cannot obtain.

An architect so fortunately situated as to have been associated with numerous successfully operated hotels, must certainly be able to give to the new clients of his, ability and experience in design and construction of extreme value to these new clients.

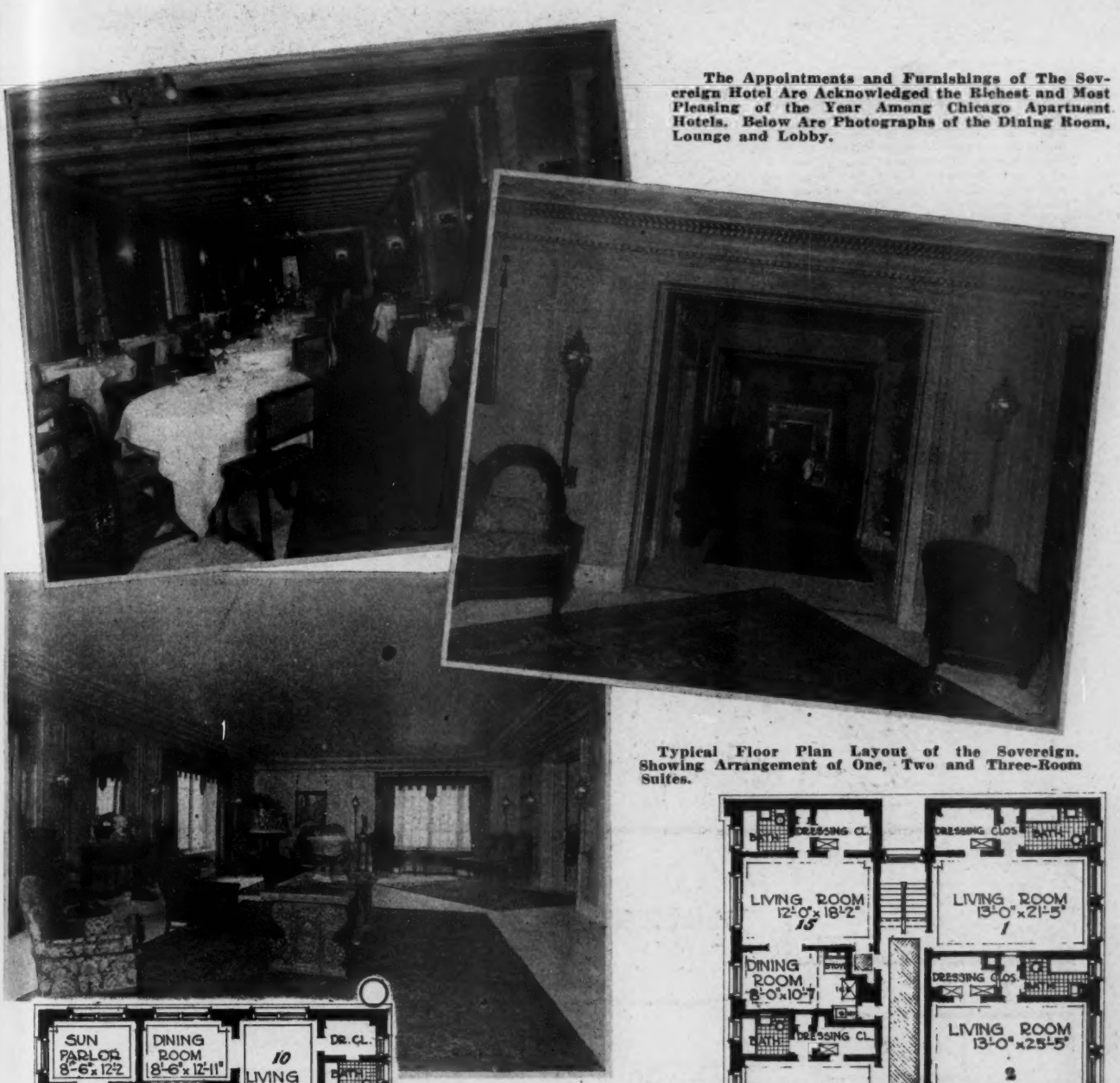
The modern hotel is more than an investment; it should be looked upon as representing the home of an institution or new business, operated for profit, which if it does not yield to its owners a far greater return per dollar of invested capital than what is normally expected from the ordinary investment, will not have fulfilled its mission



The Sovereign Planned as Chicago's Foremost Apartment Hotel, Located at Kenmore and Grandville Avenues. This is a Ten-Story Building, 100x150 Feet.

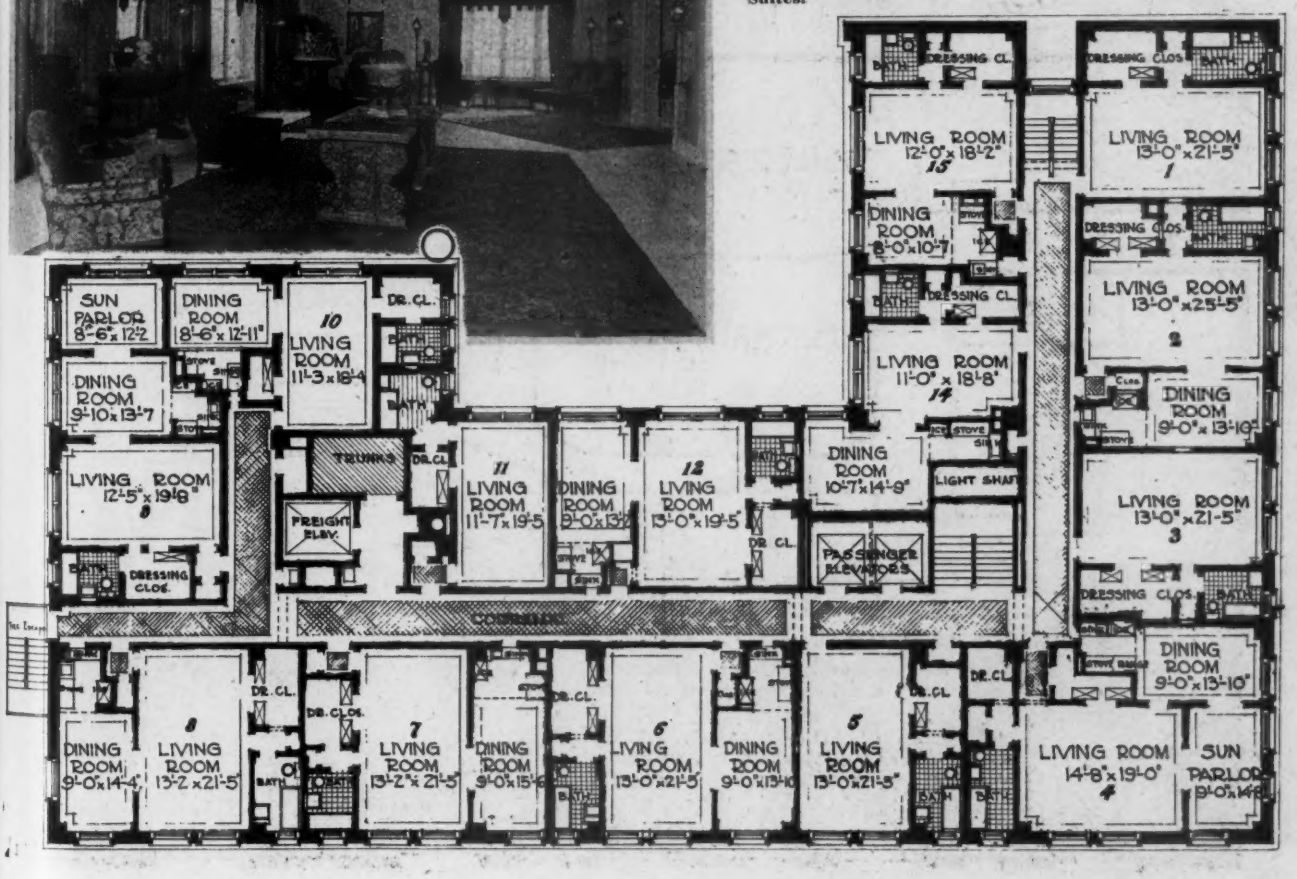
WORK OF
WALTER W AHLSCHLAGER
ENGINEER

ARCHITECT — FINANCE

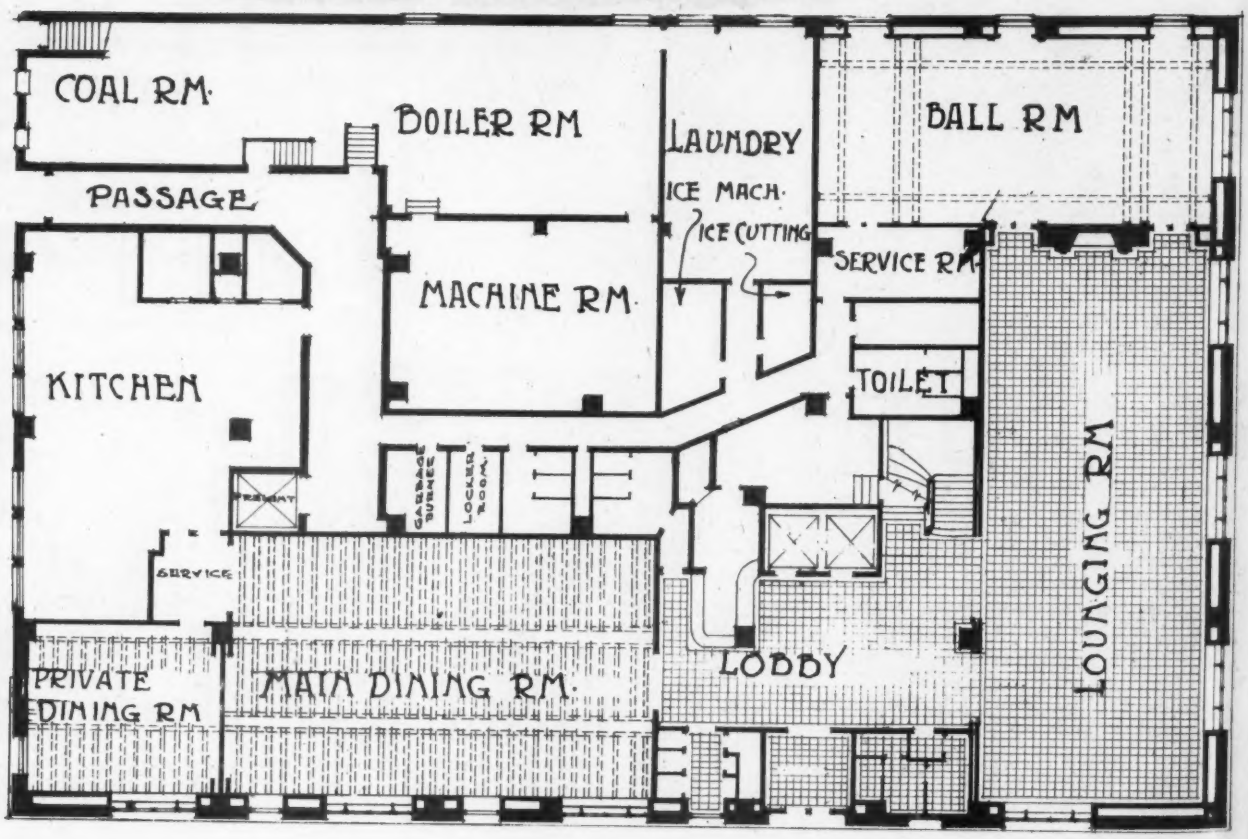


The Appointments and Furnishings of The Sovereign Hotel Are Acknowledged the Richest and Most Pleasing of the Year Among Chicago Apartment Hotels. Below Are Photographs of the Dining Room, Lounge and Lobby.

Typical Floor Plan Layout of the Sovereign, Showing Arrangement of One, Two and Three-Room Suites.



Two Views of Typical Apartments in The Sovereign—One a Three-Room, the Other a Two-Room Suite. The Equipment Includes Disappearing Beds and Mechanical Refrigeration. The Furnishings Thruout Breathe Refinement and Quiet Elegance in Accordance With the Demands of the Exclusive Patronage Which This Apartment Hotel Enjoys.

Rentals at The Sovereign Range From $100 a Month for a One-Room Apartment With Dressing Room and Bath; $150 for a Living Room, Dining Room, Kitchenette, Entrance Hall, Dressing Room and Bathroom; $260 for a Three-Room Apartment to $325 Per Month for the Most Desirable Corner Apartments. These Rates Yield a Yearly Gross Rental of $260,280.

Below is Diagram of the Ground Floor of The Sovereign Hotel.